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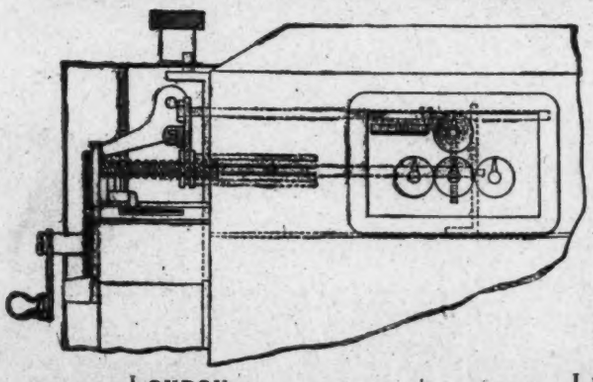

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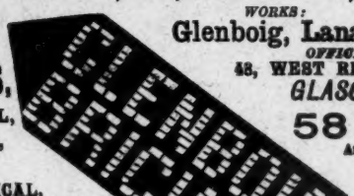

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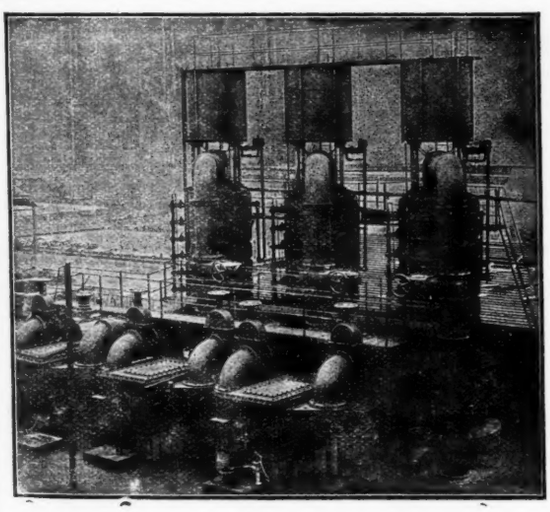

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLIV., No. 2900.] TUESDAY, DECEMBER 10, 1918. [70TH YEAR.

EDITORIAL NOTES.

National Gas Council Membership Forms.—A Prompt Return Desirable.

TIME and its circumstances press in the matter of getting the new National Gas Council together, and its machinery at work. Those responsible for taking the initial steps quite recognize this; and they are not intending that want of activity on their part shall in any way impede the building-up of the organization, and setting it in motion. We understand that this week the invitations to gas undertakings to join the Council will be circulated; and it will be a great assistance if Boards of Directors and Gas Committees will fill up the forms and return them with all expedition. It is sincerely hoped that there will be no delay, because there are other constructive things to be done, besides obtaining the adherence and enrolment of gas undertakings, before the machinery is in final order, with a duly elected Central Executive Board in office. Those undertakings that postpone the completion of the form signifying their desire to become members may, through the delay, be robbing themselves of their privilege to nominate and vote for representatives from the District Executive Boards to take part in the work of the Central Board. Directly a sufficient number of forms are sent in from all the areas, the next step will be, it is gathered, to seek the good offices of the Secretaries of the District Gas Associations to summon meetings of the undertakings in each Association territory, for the purpose of forming the District Executive Boards, appoint a Chairman and Vice-Chairman, a Management Committee, and Secretary or Secretaries, as well as the four representatives from each to act on the Central Executive Board. The procedure and scope of action of the District Executive Boards are defined by the Constitution and Rules. If only the gas undertakings will act with alacrity in notifying their adherence, the remainder should be a very simple and interesting matter; and the result to the gas industry should be invaluable.

It should need no argument in these days to induce those responsible for gas administration to do, in the interests of their individual undertakings and in those of the industry as a whole, their part in getting the machinery of the Council assembled and in running order. Every day now new problems are thrusting themselves forward which the industry will, as a whole, have to consider and deal with. Questions of new construction, reconstruction, and development, which will affect not only our industrial but our domestic and social life, are under consideration, and in many cases are being replied to by the devising and presentation of concrete schemes. One development generates another. New ideals are being formed; fresh ideas are sprung upon us before others have had time to get firmly established. These are pregnant days—days of evolution; and a period of development is what we have to be promptly prepared for. The industry must be ready with its own duly authorized central body prepared to treat, negotiate, confer, direct to proper channels, protect, and accelerate. There is a great deal to be done, in reference to both internal and external matters. The internal ones are many. New principles and new policy have to be applied. The industry's conditions have to be made to fully conform to circumstances, both existent and arising. To allow the industry to drift, without central representation and voice, would mean that it would not have an established place in the creative doings of the times. It would simply drift, drift, drift, and be an onlooker, while others were reaping advantage. All that could be done would be by individual undertakings, without authority to speak and act for the entire industry. This will not do. Government Departments ask for and want to deal with and through an authorized body. They have no time to hear, consider, and decide upon the views and requirements of a great number of individual concerns in regard to matters that affect the whole. Things must move less cumbrously nowadays. It is for the gas undertakings to elect their own representative body, the same as it is for the parliamentary constituencies to elect their own House of Commons, from which the Government of the country is drawn.

The point we want to emphasize particularly is that the machinery of the new Council should be brought into order quickly, and that the first step to this is by gas undertakings filling-up the form of membership, and returning it without delay. The country at the present time is engaged in the election of a new Parliament; and the country is going to see this through before the end of the year. It is not too much to suggest that it ought to require even less time for the gas undertakings of the United Kingdom to complete the membership forms of the new National Gas Council, so that the next step may be taken, and the Council be a finished structure ready to move and act in those matters that are in the mould and will be ready for consideration early in the New Year, with many others to follow.

A Declaration of Policy.

EVEN if the gas industry had no internal matters of its own that require the co-operation of the whole of the gas undertakings to effectively handle them, the declaration of home policy which the Prime Minister issued towards the close of last week should be sufficient to ensure the uniting of the gas undertakings of the country, in the National Gas Council, to bring to bear their combined power to see that the interests of the industry have full and just consideration, and are properly defended. The programme which Mr. Lloyd George has put before the country is one which means the reconstruction of our national life, and the improvement of our social environment and conditions. The scheme is big and ambitious; and the statesman who can bring it all about, without offending justice, will deserve well of his fellows. It means that the country is going to take upon itself greater responsibilities with respect to internal change and transformation. It is work that, had the country not been lethargic in the past, would have been taken in hand before this. Only a war has awakened us to a sense of our responsibilities, which is not a creditable thing to have to acknowledge.

Labour is to have better reward in the way of payment than before; but it is hoped that any reformation in this respect will include the remodelling of the conditions upon which labour renders its service. The productive resources of the country are to be increased (this is essential from all points of view), not only for the enrichment of employers, but for the enrichment of all classes. At the present time labour in all directions is looking well after itself, and it is seeking to retain in future much that has been awarded to it during the war in respect of the increased cost of living. But whatever the conditions of the payment of the future, they should have at any rate some relation to the part that labour takes in advancing the productivity of the country, which means that some of the present trade union formulæ will have to be sacrificed and new be established. We are glad to see that Mr. Lloyd George is prepared to "work "hard for any scheme of profit-sharing which provides the "workman with a real inducement to increase production." The contribution that Mr. Charles Carpenter, D.Sc., made at

the conference of the Labour Co-Partnership Association last Wednesday will supply the Premier with one scheme the intrinsic value of which has been demonstrated in many places in the gas industry. In profit-sharing, Mr. Lloyd George believes lies our national salvation. Then transport is to be developed—transport not only by railways but by canals. Mr. Winston Churchill has spoken of an intention to take up the question of the nationalization of the railways. These are matters that concern the gas industry. But in the Prime Minister's declaration of policy an outstanding feature is this: "One of the important things the Government has "in mind is the utilization of our great mineral resources "for the production of electrical power on a large scale. "This will enable rural industries to be created. . . . A "great electrical power scheme would also assist in cheapen- "ing and increasing the efficiency of our town industries, "so as to increase the output, diminish the cost, and thus "enable all classes interested in production to benefit." We have nothing to say against the development of the electrical industry to any degree that will be favourable to the country's fortunes; but it does appear that the Government are going along blindly in this matter, guided only by the views of a comparatively few interested individuals, with experts of comparable eminence opposed to the country creating for itself a white elephant, while other courses of a more commendable nature offer. And at the same time there has been no consideration of whether or not there is another industry whose interests ought (in company with the electrical, and in the interests of the country) to receive equally the assistance of the Government. This is a matter the new National Gas Council will have to watch, and in regard to which quick decisions will probably have to be made, and quick action taken.

The declaration of policy by the Prime Minister is causing the electrical development project to form one of the planks of the platform of the parliamentary candidates, so that in one way or the other electricity is receiving just now a good deal of publicity, without any expense to the industry itself. Newcastle is the centre of a great municipal opposition to the proposals that have been formulated by the Departmental Committees for the reorganizing of electricity supply on a national basis. The opposition is not directed against placing the electrical industry on a firmer footing, but against the means contemplated by the Government for doing this. In a Newcastle paper, Mr. W. C. Mountain, Consulting Electrical Engineer, however, cautions the electorate not to expect that sixteen super-power stations can be equipped as if by magic to deal with the electricity supply of the kingdom. The scheme will take years to accomplish; and in the interim industrial power must still be provided. He is also convinced that there is a large number of undertakings that can produce electricity at a very much lower cost than it could be either produced or supplied by any power station installed for general service. This is just what other qualified electricians have said. But the Government have had their reports; and they appear prepared to take their stand upon them, as though there did not exist any other opinions worth hearing. Mr. Mountain is favourable to such electrical schemes being developed by private enterprise rather than by the Government. In any case, he says, it would mean an enormous organization as regards staff, and a very costly one; and his view is that the working and distribution costs would probably exceed the cost of operating smaller undertakings conducted on commercial lines. At first blush, it might seem that the interests of the gas industry would be best served by an indifference to this matter—letting the electrical industry, under the *ægis* of the Government, prepare the pit in which would take place its own commercial undoing. But the gas industry is a considerable tax and rate payer; and it has had an unpleasant experience of the conduct of electrical adventure to the maintenance of which, although a competitor, it has had (much against its notions of justice) to contribute. The gas industry does not want any extension of this sort of thing. It is a matter which, in order to secure protection, gas undertakings large and small must attend to through their own elected and authorized National Gas Council.

An Opportunity for Benzol Producers to Work in Unison.

A GREAT deal of interest is being taken by the technical and commercial advisers of gas undertakings in the future of benzol; and it is certain that there is no intention on their part, excepting in perhaps some few cases, of relinquishing the production. The contribution to the heating value of gas due to the non-extraction of benzol is so relatively small, and the value of benzol as a motor fuel, for the dye industry, and for other purposes, is so considerable that there cannot be two questions as to the duty of the gas industry in the matter of its continued production. Whether it will pay depends upon the price; and when (if ever) it is determined that it does not pay, will be time enough to talk about abandoning the process and the valuable plant that is in existence. When one surveys the entire position as to the future, both in respect of the demand for, and the supply of, motor spirit, there is very good reason to believe that continued extraction will pay, and that well. The interest in the matter has been, and is again to-day, reflected in our "Correspondence" columns, and especially by the receipt of the "Constitution and Rules" of the newly-established National Benzol Association, particulars concerning which appear elsewhere. The Association is to be composed of benzol producers; and it is patent that the forming of this body means that the manufacturers intend to run the business by themselves and not to fall under the domination of the petroleum magnates. The Association's objects embrace propaganda work in interesting motor users and others at home and abroad in benzol as a motor spirit; and it will be their endeavour to secure and maintain a fair market price for the commodity. The "fair" deserves emphasis, because motor users have had good reason in the past for entertaining the view that they have not always had fair treatment at the hands of those who have the control and the dispensing of petrol. The vast importance of standardizing benzol for motor use has been a matter of frequent comment by us and correspondents; and it is seen that the Association are to deal with this matter. Research work with the view to improvement is part of the programme. This is a new branch of industry for gas undertakings; and they will therefore do well to work in unison, so as to establish their place in this respect "in the sun." The financial support asked is very modest; the effect of united work promises to be out of all proportion to the monetary help desired.

A Contest between Electric and Gas Ovens.

FOR years the advocates of electrical cooking have been issuing literature and stumping the country talking extravagantly of the superiority of electric cooking over gas cooking. There was not a point in which at the outset, according to the electrical apostles, the electric-cooker did not excel in respect of operation; but initial and maintenance costs and a few other pertinent matters were left severely alone. In its running costs, the electric-cooker, so it was claimed, showed to advantage; but, when pressed, there was recession from all operations save work in the oven. The electricians are exceptionally clever at making use of the background for storing away all that is inconvenient to them. Then there were assertions that joints and other food in gas-ovens were cooked in an atmosphere of poisonous fumes. When the electricians supplanted nescience with knowledge as to the facts regarding the products of gas combustion—carbonic acid and water vapour—they regretfully resigned that point. Then they thought to trap the public with the subtle fallacy that the meat cooked absorbed "fumes" from the gas. When it dawned upon them that as joints in the process of baking are exuding moisture, and so could not be performing the miracle of imbibing "fumes" at the same time, they considered it discreet to relinquish also that point from their polemical armoury. They denied that the maintenance costs of the electric-cooker were higher than in the case of the gas-cooker. After a bit, examination of the wiring, switches, elements, fuses, and fitments generally, compared with the strong gas-oven with simple burners, tubes, and taps, suggested that perhaps it would be safe to push aside that argument. There was silence as to the questions of time, range of operations, and reliability. So the advocates came to the last ditch; and in this they have stuck, despite ridicule as to the untenable character of their argument. That is the question of the shrinkage of meat. How often, however, has there been challenge to them to prove that there is any appreciable difference in favour of electrical operation, under equal temperature conditions in the ovens, and equal time and degree of cooking, given comparable joints in weight and physical characteristics? How often has there been silent refusal of the challenge? Still by strained effrontery the electrical advocates have persistently continued to cling to the last

argument; for they know that, if they let it go, whether right or wrong, they are completely stripped of any support to the case for electrical cooking. They saw a rift in the blankness around them when coal conservation was talked about. There was temporarily a claim to be chief among the coal economizers in the country, until there was public exposure of the grossly bad thermal efficiency of the electricity generating processes, for which the efficiency of electrical appliances would not compensate.

There came an intrepid maker of electrical appliances—one C. R. Belling—who believed he had the very latest thing in the way of electric-cookers; and he issued a challenge to show that he could with this cooker produce some remarkable coal, meat, and money savings. The British Commercial Gas Association took up the challenge; and the result is that Mr. Belling has come rolling down from the mountainous heights at which he had placed himself to the level of concrete facts. The whole story is told in later columns of this issue. The British Commercial Gas Association did well in dealing with the vain boasting and pretence. But we will give Mr. Belling credit; he wants to fight again. But his more cautious electrical friends are hanging on to his coat-tails, trying to hold him back from further indulging in competitive escapades. There is little chance of him doing so, as the British Commercial Gas Association have made it a condition—as is very right and proper—that any further tests should include all cooking operations on the hot-plate and so forth. The hot-plate is the greatest of the weaknesses of the electric-cooker; but on a gas-cooker, it is the most used part. The bulk of householders want an appliance that can give all-round economical service, not one appliance for this purpose, and another for that. Electrical writers have been making all sorts of excuses for the Belling fiasco; but when they read the full report on the tests, and the correspondence, they will understand that they would have been better employed in accepting the position than in trying by verbal trickery to mitigate the defeat. If the results had been the other way about, nothing too good could have been said by them about Mr. Belling. He did his best. From what is seen in the report, he operated the switches with the greatest agility in trying to illustrate the capacity of the oven to make a large saving in the country's coal resources, and to show a big money economy. But he failed. The savings, he has proved, are on the side of gas, and not on that of electrical, operation. He has also attested that cooking by electricity is not, when attempting to realize the minimum cost, the simple thing that its advocates have described; and he has also demonstrated that the saving in shrinkage is in ratio to the uncooked character of the meat. Another point he has helped to confirm is that by the gentle persuasion of low temperatures, and slowly cooking meat, the temptation to the nutritious juices to escape bounds with the dripping is too much for them to resist.

Mr. Belling is a sadder but wiser man. He does not appear to care for future tests having attached to them the condition that the loser must pay for public advertisements announcing the results. This is unsportsmanlike; for he has the choice of an electric-cooker, and the gas side must now have the choice of a cooker that is on the market that shows a good attainable working efficiency, and the whole range of cooking operations are to be included. Nothing could be fairer. Mr. Belling's electrical advisers plead with him to keep clear of further adventure in this line. They are prudent. But other people have a right to their own opinions as to this backing-out attitude.

It is noticed that both the "Electrical Times" and "Electrical Industries," in their references to the contest, quote the results of the comparative trials carried out at Brighton six or seven years ago, and which were published by us at the time. A quantity of water has since passed under the bridges. Gas-cookers have been improved, and cooks who have studied the electrical mode of obtaining low percentages of meat shringage have learnt that a modification of temperatures and longer duration baking have a marvellous effect in this direction. It may be suggested to our contemporaries that we are dealing with conditions obtaining in 1918, not with the preliminary work of best part of a decade ago. Surely they can do something better than that.

Closer Relationships with the Consumer.

THE practical character and opportuneness of the address which Mr. E. L. Oughton, of Longwood, delivered to the Yorkshire Junior Association last Saturday, must have impressed his hearers as it will do his readers. He did not enter at length into those problems of dominating importance to the gas industry which have to do with the administrators and chief executive officers; but he showed that outside them there are matters for consideration and energetic action which must not be bye-passed if the industry is to hold its own and progress in the coming competitive struggle. It would be foolish to reconstruct and reform at one end only of our line of many operations. There is no part of the line which we can afford to neglect. The industry will have to look more and more to the details of its practice in the outdoor department in order to ensure that the consumers derive the utmost economy and efficiency from their various uses of gas. This will mean more work and more expense; but the end will reward the work and justify the expense. The address is in such concise and readable form that we will not traverse it for the sake of emphasizing it. Only one point. In private lighting electricity offers strong competition; and it is more its convenience than anything else that has secured its adoption. It is not the composition of the electric light, nor the measure of its intrinsic brilliancy, nor the cost that has enabled it to make its way up to this stage; and, incandescent gas lighting possessing genuine superiority in all three respects, we have long been convinced that the gas industry has failed to make the most of these advantages as a set-off to a convenience which itself has been discounted by various methods of automatic lighting and extinguishing devised for incandescent gas-burners. The gas industry has to take a larger part than ever in work which will bring about still more intimate relations with the public upon whom it depends for business development.

Priority in Coal Deliveries—Position of Gas-Works.

In last week's issue (p. 506), we quoted from the "Iron and Coal Trades Review" instructions as to priority in coal delivery that the Coal Controller had issued to collieries; and, according to the information, the gas and electricity works' supplies were placed seventh, or at the very bottom of the list. "A Sufferer" in this week's issue, who is associated with a gas undertaking of considerable magnitude, and is in close touch with collieries, gives the list in the same order as that which we published upon the authority of our coal contemporary. This does not square with information which we have received from the Hon. Secretary of the Institution of Gas Engineers (Mr. W. E. Price). He tells us that it has been ascertained from the office of the Coal Controller that the order of priority for the distribution of coal is as follows: (1) Admiralty; (2) household, including military camps and hospitals; (3) gas and electricity works; (4) railways; (5) bunkers; (6) export. This places gas-works in a far more favourable position. But how comes it that both the "Iron and Coal Trades Review" and our correspondent have erred as to the instructions sent to collieries? Obviously our correspondent quotes from the official circular. Does the information from Mr. Price mean that the instructions have undergone revision, or what is the explanation? Perhaps some of our colliery friends will say whether they have had fresh instructions.

Gas Standards for the Time Being.

Those gas engineers who think that the liberty given by the Ministry of Munitions to relax or abandon (as thought proper) the oil and tar washing of gas means a return to pre-war standards, or any change in those standards made since in Private Bills or Orders, will have noticed that up to the present time there has been no official withdrawal of the Order which gives the right to supply coal gas of 500 B.Th.U. gross before washing and, where mixed gases are supplied, 450 B.Th.U. gross after washing. In the minutes of the Executive Committee of the National Gas Council which we publish to-day, it is stated that "the steps which had been taken in assisting the Government in determining what should be the future composition, quality, and pressure of gas were reported; also that, until a decision had been arrived at, it was anticipated that the regulation under the Defence of the Realm Act, affecting the supply of gas, would be continued." The last piece of information should be noted, in view of recent incidents in the Public Press. The country still wants benzol and liquid fuel; and the Coal Controller still desires the support of those gas undertakings that can render help in economizing coal.

The Coal Shortage.

The fresh data issued by the Coal Controller as to the output of coal this year will not do anything to allay anxiety, but will

rather increase it, in view of the day-by-day advance there is in the demand for coal at this period. The lower requirement for munition purposes will not counterbalance the reduction of output and the demands that are being made upon the collieries in view of the shortness of stocks about the country, the greater consumption, and the requirements of our Allies. Moreover, although miners will be returning to the mines shortly at the rate of 5000 per day, owing to the large leeway that has to be made up, some little time must elapse before the increase in the output of coal is felt. For the forty weeks of the year to Oct. 12, the output statistics show a deficiency, compared with the corresponding period of 1917, of close upon 16½ million tons. A singular thing is that in the last eight weeks of the period the output has declined by nearly 3 million tons—just the period when those who are wanting coal so badly were hoping to see an increase of supplies. This is in part attributed to the railwaymen's dispute, owing to which one day on the average was lost by the pits in South Wales and Monmouth. Loss of time, disputes, accidents, &c., have also combined to reduce the producing capacity of the industry generally. But when we see that since the end of March the stocks of coal held at the mines and in trucks have been reduced to the extent of approximately 1½ million tons, the position does not raise hopes, more especially in view of the warning that with the return of miners from the Army "some little time must elapse before the increase in the output of coal is felt."

The Troubles of Fuel Rationing.

We are nearly at the end of the second quarter since the new Fuel and Lighting Rationing Order was launched; and a confession has been made that the country is not taking at all kindly to the rationing—because householders either do not understand what they have to do or are indifferent. Government Departments are notoriously fond of complication, and fuel and lighting rationing is one of the most complex of all the systems that have been devised during the war to provide the country with necessities. Government officials would be the last to acknowledge that their level of intelligence is that of the masses of the people; and yet the masses of the people are supposed to be able to understand all that even a good many Government officials cannot grasp. The confession to which reference is here made is that there is widespread misconception regarding what must be done with form F.H.F.3, the filling up of which is required to show the manner in which a householder desires to take his fuel and lighting allowance. Many people consider the form as the instrument authorizing them to obtain fuel supplies, and so care is taken of it by placing it behind the clock, or putting it in some other place for security, while the Local Fuel Overseer is kept patiently waiting for it to enable the issue of certificates to coal merchants and gas and electricity suppliers. When it is learned that 12,000 persons in the Islington area alone have failed to return the form to the Local Fuel Overseer, curiosity is aroused as to the total of the householders who have similarly failed throughout the country. The fact is not a testimony to simplicity, nor to the steps taken to ensure that the people appreciate the necessity for filling-up the form, and returning it to the Local Fuel Overseer. These gentlemen must be having a lively time.

Retirement of Mr. James Stewart.

It is with the deepest personal regret that we announce the retirement, as from the end of November, of Mr. James Stewart, the Editor of the "Gas World." Had the retirement not been hastened by spells of somewhat indifferent health, the regret would have been tempered by the pleasure we should have had in congratulating one whose friendship has been long and unbroken upon his release from the strenuous life of a technical journalist, and his entry upon a period of well-earned rest. It is many years since that Mr. Stewart, in addition to his other journalistic work in the Manchester district, was the representative of the "JOURNAL" there. This particular tie was broken when he acquired an interest in the "Gas World," and became its Editor But the tie of good friendship remained; and throughout the passing years, Mr. Stewart has continued, in all senses of the term, a good journalistic colleague. In his retirement, friendship's link is unbroken; and we shall hope to meet for many years to come as occasion offers, and to have the satisfaction of seeing him enjoy life with health restored by rest and changed environment. To the editorial chair of the "Gas World," Mr. Peter Robertson passes. He has been associated for many years with our contemporary, even before Mr. Stewart; and, also as an old-standing friend, we wish him the fullest success.

PERSONAL.

Mr. J. J. M'EVOY, the Manager of the Midleton (co. Cork) Gas Company, has been appointed to the managership of the Wexford Gas Company.

Mr. WILLIAM J. SERRILL, Distribution Engineer of the Philadelphia Gas-Works, is now Assistant to the General Manager of the United Gas Improvement Company. Mr. WALTON FORSTALL, Assistant Distribution Engineer, has succeeded Mr. Serrill.

We learn, with considerable regret, that Mr. WALTER T. DUNN, the Secretary of the Institution of Gas Engineers, has had another breakdown in health, and has been ordered to take a thorough rest for two or three months. We hope that this will completely re-establish his health.

At the ordinary meeting last Tuesday of the Institution of Civil Engineers the election of a long list (113) of associate members was reported—including: Mr. W. NEWTON BOOTH, B.Sc., of the Royal Arsenal, Woolwich, Gas-Works; and Captain JOSEPH HAWKSLEY, JUN., R.F.A., of Great Yarmouth.

Mr. JASPER COOK, who has been with the Herne Bay Gas and Electricity Company for nearly a quarter-of-a-century, has been appointed Assistant Engineer to the Bedford Gas Company. The regard in which he is held in the town has been manifested by the presentation to him of an inscribed silver salver, by members of the Herne Bay Conservative Club.

The Leeds City Council, at their meeting last Wednesday, appointed Mr. PERCIVAL WHEELER to act as Manager of their York Street works, and Mr. HAROLD SHEWRING to be Assistant Manager at the Meadow Lane works. Mr. Wheeler was previously Assistant Engineer and Manager to Low Temperature Carbonization, Limited, at Barugh, near Barnsley, and before that was Senior Assistant Engineer at the Bow Common works of the Gas Light and Coke Company. Mr. Shewring has occupied the position of Second Assistant Engineer and Manager to the Warrington Corporation Gas Department.

On Thursday, the 5th inst., the marriage took place at St. George's, Hanover Square, of Captain LAURENCE HILL WATSON, M.C., and MARGERY WINIFRED, the only surviving daughter of Mr. A. E. BROADBERRY, the General Manager of the Tottenham District Light, Heat, and Power Company. At the outbreak of war, the bridegroom was at Oriel College, Oxford, qualifying for Scottish Law, devoting himself to athletics, and working zealously in the Officers' Training Corps, as he had done previously at Fettes College, Edinburgh. Giving up a brilliant scholastic career, he took a commission in the 5th Highland Light Infantry, and has fought in Egypt, Gallipoli, Palestine, and France. He has been twice wounded—once near Jerusalem, and then severely in France—but has now quite recovered. The official account, in yesterday's "Times," of the actions which won him the Military Cross was: "He led his company with great gallantry in three separate attacks on a point in the main position of the enemy, in face of intense machine-gun and trench-mortar fire, through peculiarly dense wire entanglements. Though the company were eventually unable to retain the positions they captured, only the fine and determined leadership of this officer, and his coolness and disregard of danger, enabled the front line to be reached, in spite of exceptional difficulties."

OBITUARY.

Mr. H. HODGETTS, the Superintendent of the water-gas plant at the Meadow Lane works of the Leeds Gas Department, who died last Tuesday, had occupied this position for about fifteen years. During this time his geniality had made him many friends, and his loss will be keenly felt.

Re-Instating Gas Employees Serving in the Royal Navy.

In reply to their inquiry regarding the re-instatement in gas undertakings of employees at present serving in the Royal Navy, the National Gas Council have been informed, by command of the Lords Commissioners of the Admiralty, that application should be made to the Ministry of Labour, No. 6, Whitehall Gardens.

Midland Junior Association.—The Hon. Secretary (Mr. H. W. Dean) intimates that a visit announced in the programme for next Saturday will not take place, owing to the state of transition in which firms find themselves through conditions due to the armistice. In place of the one abandoned, however, a special visit will be arranged for a later date in the session.

Temporary Increase of Charges Act.—The Board of Trade have made Orders under the Statutory Undertakings (Temporary Increase of Charges) Act in favour of the Llynvi Valley Gas Company and the Herts and Essex Water-Works Company. Applications have been made to the Board under the Act by the Ely Gas and Electricity Company, Ltd., the Pembroke Docks and Town Gas Company, the Wandsworth, Wimbledon, and Epsom District Gas Company, and the Westgate and Birchington Water Company. The Local Government Board have received applications for Orders from the Barry Urban District Council, the Ramsgate Corporation, and the Yeovil Corporation.

THE ELECTRIC AND GAS COOKER TESTS.

The Defeat of the Electric-Oven, and Destruction of the Belling Claims.

"THE truth, the whole truth, and nothing but the truth" is very desirable in all matters of controversy. Taking information from the Electrical Press, it is found that the whole truth is not there told regarding the recent competitive tests which Mr. Belling ventured to carry out in conjunction with the British Commercial Gas Association, with an electric-cooker which he himself no doubt (as he made it) considers the best in the world, and a gas-cooker of his own choice, which is not the latest among gas-cooker productions—being a Richmond, No. 160. The tests have formed the subject of various paragraphs in the "Electric Supply Memoranda" recently. Mr. Belling brought the test upon himself; and he is now trying to shuffle-out of the consequences of it, which, as has been shown, are not at all to his liking. There has been pretence in the electrical papers that the British Commercial Gas Association, having secured the victory with rival cookers of Mr. Belling's own selection, were unwilling to engage in another test. That this is a fabrication, an inaccuracy, camouflage, or any other term of suitable application is seen from a letter that Mr. F. W. Goodenough, the Chairman of the Executive Committee of the Association, addressed to the "Electrical Times," in which he says he wishes to place upon record the fact that the Association offered to conduct quarterly tests in conjunction with Mr. Belling, if he so wishes, but on conditions which he does not appear to care to accept. "These conditions include payment of costs and of advertising the results by the loser, and the inclusion in the tests of all the ordinary processes of cooking—not merely the baking of meat." It is only fair that the loser should pay, but no wonder Mr. Belling is not prepared to adopt the "conditions," including as they do the payment for advertising to the world the inferiority in over-all use of his own electric cooking productions in comparison with gas-cookers. There is one other point in Mr. Goodenough's letter bearing upon over-all use. He says: "The householder wants to know what system of cooking to adopt, and is not prepared, nor has the room to instal one stove for baking and another for the other processes of cooking. Fortunately it is easy to obtain the most economical means for carrying out all of them combined in the one appliance—the gas-cooker."

FLIGHTS OF IMAGINATION AND ACTUAL RESULTS.

The December issue of the Association's "Bulletin" publishes (in about fifteen columns) a report, with appendices, on the origin, the conduct, and the results of the tests. It is clear that flights of imagination are the characteristic of many of the claims made by electricians regarding electric cooking, and the flights of Mr. Belling's imagination have put him into a painful quandary. A great deal has been made in the electrical papers of the tests having been carried out on "B.C.G.A." conditions; but as a matter of fact the Association, it is found, generously allowed Mr. Belling to choose the most vital of all conditions—the gas-cooker employed in the tests, which were carried out in the presence of an impartial umpire. His own published figures were taken as the ground for investigation. What more could the electricians want? Mr. Belling as far back as April last published his claims in actual figures of coal, money, and meat savings. Whether the electrical papers now protesting against the tests and Mr. Belling's participation in further ones are those which drew revenue from him in advertising his challenge, we are not aware. But it seems that he did not then know just where he stood, and he certainly does not now. Hence there is some justification on our part in speaking of flights of imagination. Let us just quote Mr. Belling's claims, and repeat the results of the tests:

MR. BELLING CLAIMED—	THE TESTS PROVED—
That in cooking 15 million pounds of meat, if electricity were used instead of gas, there would be:	That cooking 15 million pounds of meat by electricity instead of gas would result in:
(*a*) A saving of 3150 tons of coal.	(*a*) A loss of 3500 tons of coal.
(*b*) A saving of £2500 in working costs.	(*b*) A loss of £10,000 (taking the same prices for comparison as the claimant).
(*c*) A saving of 1,500,000 lbs. of meat.	(*c*) No saving in meat if it were properly cooked in both cases.

From the reports in the "Bulletin," it is noticed that to do an equal amount of baking by electricity and by gas involves the net destruction of slightly over 4 tons of coal in the case of electricity compared with 1 ton in the case of gas. This only refers to oven work; for boiling and hot-plate work, the case is far more unfavourable for electricity.

DETAILS FROM THE REPORT TO THE EXECUTIVE COMMITTEE.

The works of Messrs. Belling & Co. are at Edmonton; and it was Mr. A. E. Broadberry—always a good sportsman—who accepted on behalf of the "B.C.G.A." the challenge contained in a full-page advertisement which Mr. Belling had caused to appear in electrical papers. The tests were carried out at the Wood Green Power Station of the Tottenham Light, Heat, and Power Company. On behalf of the Association, Mr. J. G. Clark took the matter in hand. Mr. Belling had in his possession the old pattern No. 160 Richmond gas-cooker; and as he was anxious this should be used, this advantage was accorded him. Another advantage for his side was conceded. This was the fitting of the stove with a 3 feet length of flue; but he objected to a damper being fitted to the oven. He also desired the test to be confined to oven work, although he suggested that some further experiments relative to hot-plate and other work might be made subsequently. Some 150 lbs. of meat were required for the tests; and enough was obtained—care being taken that it was all English, and cut from the same beast. The weights of the joints were as follows:

	To be Electrically Cooked. Lbs. Oz.	To be Gas Cooked. Lbs. Oz.
Wing ribs	18 2	18 1
Silverside	16 0	16 1
Sirloin	16 6	15 6
Topside	16 2	16 2
Total	66 10	65 10

"EVEN A CHILD MAY USE THEM"—THE LEAKAGE OF NUTRITIOUS JUICES.

Miss L. Thorpe, formerly Chief Instructor at the National Training School of Cookery, kindly undertook the responsibility of adjudicating at the contest; while Miss Helen Edden and her assistants attended to the gas cooking. The gas and electricity meters were read by both electricity and gas representatives.

The "automatic" character of electric cooking is a claim of electrical people. "Even a child may use these cookers," electrical statement avows. Mr. Clark regards as—

> An important matter from the practical point of view the fact that, whereas the gas consumption was left practically unaltered after the oven had been heated-up, the consumption of electricity was controlled by a thermometer—being sometimes full on, sometimes at "medium," sometimes at "low," and even at times cut off altogether. Practically the gas-cooked joints were cooked by the clock; very little attention being necessary between the time the joints were placed in and the time they were withdrawn.

Miss Thorpe points out what we have observed before, that—

> The dripping from the electrically cooked joints contained more of the nutritious juices than the dripping from the gas-cooked joints. It is surely better for these to remain in the meat than to be exuded with the dripping.

To some extent the experiments were indeterminate—due mainly to the desire of the electricity people to keep the meat shrinkage down to the lowest possible point. Their zeal in this direction resulted in some of their joints being obviously underdone.

COAL, MEAT SHRINKAGE, AND WORKING COSTS.

We will let Mr. Clark tell the rest of the story in his own words:

> The coal consumed per unit of electricity is not too well known, but we may presume that Mr. Belling was careful enough not to put it too high in his advertisements. He gives it as 0·28 units per pound, equal to 3·57 lbs. per unit. Our experiments revealed that 124 c.ft. of gas were at least equal in practical work to 12·89 units of electricity. Assuming straight coal gas to be diluted with blue gas so as to yield 15,000 c.ft. of mixed gas per ton of coal, there will remain 8 cwt. of coke for sale. For the case in question the coal consumption might, therefore, be stated as follows:
>
> 12·89 units at 3·57 lbs. per unit = 46 lbs. of coal
> 124 c.ft. of gas = 18·7 lbs. of coal
> Less 7·5 lbs. of coke = 11·2 ,,
> Difference 34·8 lbs. of coal.
>
> And in addition the gas undertakings provide immense quantities of bye-products.
>
> Judged by the total weight of meat cooked, the loss due to shrinkage was slightly lower in the case of the electrically cooked joints as compared with gas. Against this, however, is the fact (certified by the umpire) that some of the electrically cooked joints were distinctly not cooked, as well as being dietetically inferior. In one case (the wing ribs) the loss on the gas-cooked joint was very considerably lower than in the case of the electrically cooked one; but in this instance the electrically cooked joint was cooked to a greater degree. It was intended that this joint should be withdrawn before completely cooked; but while we were able to comply with this intention with gas, the electrical people rather overdid it. Considering all things, one finds not the slightest difficulty in regarding the two agents as equal in regard to meat loss. Indeed, I feel sure that by doing so we are treating electricity generously.
>
> The question of costs depends upon local prices. In Mr. Belling's advertisement he takes gas at 3s. 6d. per 1000 c.ft., and electricity at 1¼d. per unit. Taking these figures as a basis, the cost of cooking the joints at Wood Green works out at:
>
> Electricity, 12·89 units at 1¼d. . . . . = 16·1d.
> Gas, 124 c.ft. of gas at 3s. 6d. per 1000 c.ft. = 5·3d.
> Difference 10·8d.
>
> The gas-cooker used (Richmond, No. 160) costs about £15, compared with £17 10s. for the electric oven. Of course, the gas-cooker is much more substantial than the sheet-iron affairs that the electricians supply. It also contains many more features—viz., boiling, frying, grilling, and toasting arrangements, as compared with the simple baking power of the electric-oven. The substantial construction leads to the small

cost of maintenance, a point upon which Mr. Belling is silent in his advertisement.

In this connection it is worthy of note that one or more of the electric elements had to be replaced on the morning of the contest before the cooking could be proceeded with.

Considering the points we have conceded to Mr. Belling and the results of the contest, no impartial person can escape from the conviction that for oven cooking gas is far superior and cheaper than electricity, and for other domestic purposes the same remarks apply "only more so."

SUMMARIZED COMPARISON OF FACT WITH FICTION.

To cook 15,000,000 lbs. of meat per week would need :

	By Electricity.	By Gas.
Net coal destroyed (1).	4625 tons ..	1126 tons
Cost (2).	With current at 1¼d., £15,100	
	With gas at 3s. 6d., £4960	
Meat shrinkage (3).	Gas is at least equal to electricity in this respect.	

In the case of the four joints properly cooked in the tests reported on, the figures were :

	Gas.	Electricity.
Weight before cooking . .	535 oz. ..	552 oz.
Weight when cold . . .	398 ,, ..	410 ,,
Loss in cooking . .	137 oz. (25·5 p.c.) ..	142 oz. (25·6 p.ct.)

What Mr. Belling claimed and the tests proved is stated earlier in this article.

FROM THE REPORT OF THE UMPIRE.

Miss Thorpe, in the course of her report states :

I think that the tests were scarcely adequate because of the type of gas-stove used, which was of obsolete pattern. The comparison was also a little difficult, probably owing to excess of zeal on the part of the electrical cooking demonstrators in endevouring ot show that wastage was not so pronounced in the case of meat cooked by electricity. One of the test joints was taken out of the electric-stove too early ; and consequently, as was ultimately proved, before it was really cooked.

I also noticed what indeed I have noticed on previous occasions in electrical cookery. On examination of the dripping drawn from the joints after cooking, a larger percentage of the nutritious juices are found than in the case of meat cooked by gas. This, to my mind, is due to the regulation of the heat. I think that it would pay the electric lighting companies to have experiments made with a view to the elimination of this defect, which should be quite practicable. Any possible saving in wastage is, to my mind, at present marred by this defect, which should be curable. The colour of the meat cooked by gas appeared to be better ; and here again the electrical companies might note the possibility of improvement. Ultimately there seemed to be very little difference, if any, in the contest, although owing to the circumstances which I have mentioned above the test was not as adequate as it might have been. Both stoves were very skilfully manipulated by the demonstrators, who throughout the contest showed the keenest interest and courteous rivalry ; and it was a very pleasant contest to watch.

Mr. Belling, as our "Electric Supply Memoranda" have shown, is not taking his defeat very kindly ; and his friends are trying to restrain him from courting further disaster.

The Challenge and Ancient Tests.

Further, as to points in the foregoing article, we see that the "Electrical Times" falls back on the shortness of paper supplies to (we take it the decision is final) treat Mr. Goodenough's letter and the report on the tests to a seven-line paragraph, at the foot of a letter that had previously been sent by Mr. W. M. Mason, the Secretary of the Association. Our contemporary is evidently not anxious to publish the information contained in the report, nor the terms upon which the "B.C.G.A." are willing to take part in quarterly tests if desired by the electrical people, which does not look as though the Association are in any way frightened by electric cooking. It must not be forgotten that the Association are fully informed what electric-cookers other than the one made by Mr. Belling can do.

In the course of Mr. Mason's letter, he says :

Those tests of which the results have recently been published are not the first that have been made. Others have been made by independent persons. The results—similar to the last—have been published freely. They have never been challenged or met by any other authoritative tests. Those engaged in persuading one householder after another to adopt electricity for cooking—with the gas industry following behind replacing the rejected electric-stoves by gas-cookers at longer or shorter intervals of time (we could publish a very instructive list of such cases)—have preferred to ignore the repeated refutations of their mis-statements and continue to make them.

The Association would indeed welcome public and official tests that could not be ignored by the advocates of the use of electricity for fuel purposes. If the Institution of Electrical Engineers is prepared to take the question up, the Association will be glad to co-operate in drawing up such terms and conditions as would ensure a practical working demonstration of the relative costs, to the consumer in money and to the nation in coal, of carrying out all the culinary operations for a household (as performed by the kitchen range or the gas-cooker) first by electricity, second by gas. There would, of course, be provision made that the water required for the various cooking and cleansing purposes would not be pre-heated by a coke-boiler before being passed through an electric water-heater or boiled in an electric-kettle, as is done in some much advertised "electric" kitchens ; nor the food partially cooked in gas-stoves before being finished in electric-cookers, as has been done in "electric" kitchens and restaurants of which we have knowledge. It is often a subject of wonder whether the leaders of the industry really know the truth respecting the way in which the sale of electricity for fuel purposes is, for the time being, "furthered." It is more than doubtful if they do ; and those on this side who know the facts would welcome their enlightenment.

Altogether, the electricians are not having a comfortable time now that the offensive has been publicly taken by the "B.C.G.A."

ELECTRICITY SUPPLY MEMORANDA.

THE removal of restrictions as to the obscuration of the globes of street lamps would, we rather expected, be taken advantage of to the full by those electricity suppliers who ardently want to see as quick a return as possible to pre-war conditions in every direction, so as to make the revenue from lighting swell to as large limits as possible. But there must be no overlooking the fact that the prohibition as to using extra lamps, except in dangerous positions, has not, in the interests of coal economy, been abrogated. The Hastings Corporation Electricity Department has for years been using the public lighting as a prop for its unsatisfactory fortunes, and so has been making the ratepayers pay an indirect tax for the doubtful advantage of having electricity as the lighting agent, as well as taking generous dips into their pockets to provide the wherewithal to make good the deficiencies shown on the balance-sheets. The partial removal of lighting restrictions appears to have caused the restoration of electric street lighting at Hastings on a somewhat "lavish" scale. At any rate, "lavish" is the expression used by Mr. H. B. Carter, the Secretary of the Hastings and St. Leonard's Ratepayers' Association. As he is there and we are not, he knows better than we do the most suitable descriptive term to apply to it. This, according to him, is causing a good deal of comment in the town. His letter (which was addressed to the Town Clerk) suggests the use of alternate lamps, other than at dangerous places, seeing that the public have been for so long accustomed practically to the absence of light in the streets of the town. His letter concludes: "Householders are doing their utmost to economize in the use of fuel and light; and in view of the recent appeal to the local authorities to set the example in this direction, we [the Association] venture to suggest that in this matter an opportunity occurs for co-operation in that saving of fuel which is still so essential." Mr. Carter might be reminded that all through the piece the poor electrical trading venture of the Corporation (which has rarely been able to make both ends meet) has had its interests considered before those of the ratepayers. Perhaps the interests of the concern also come before those of the country. But no doubt Hastings is not unique in having an electricity undertaking that desires to boost up its returns as quickly as possible, now that peace is breaking through the state of war, which still exists.

"Lavish" Electric Lighting at the Ratepayers' Expense.

The electricity supply industry is full of wants at the present time. It desires to have priority in everything. The authorities, however, must not fall victims to its entreaties, but dispense equality of treatment, and not grant it preferential benevolence. We are not out of the wood yet in connection with the war, and above all in the matter of coal supply. In this respect the Coal Controller has found out the defective character of the foundation upon which the industry used to base its claim to be a coal economizer. He knows now that while some concerns are relatively frugal in their consumption of coal (though still showing poor thermal efficiency) the majority of the electrical undertakings are genuine wasters of coal. The need for repressing coal use so as to make consumption equalize supply has necessitated restrictions being put upon new electrical connections; and the electricity industry has been a trifle irritated over this. Now, according to some correspondence between Mr. T. W. Cole, of the Provincial Electric Supply Committee, and the Director of Power Supply of the Ministry of Munitions (Mr. Arnold B. Gridley), the former is anxious to ensure that the electric supply industry is placed among those "key" industries which are entitled to priority in regard to the return of their men from the Army, as well as to secure the removal of the restrictions as to new connections for the supply of electricity. Mr. Cole has got cold comfort. The Coal Controller has informed Mr. Gridley that it is impossible for him to agree to any relaxation of the restrictions for the present ; but Mr. Cole may rest assured that, as soon as circumstances admit of modification or withdrawal, this will be done. Mr. Cole must have known all this before he entered upon his superfluous task of making the inquiry. Control is not only for the purpose of imposing restrictions, but for removing them as early as circumstances permit.

Priority Wanted.

The "Electrician" is glad to note that the Chairman of Committees of the House of Lords has intimated that he will give favourable consideration to the introduction during the next session of late Private Bills for which urgency can be claimed owing to the armistice and the prospect of peace. But in its pleasure, our contemporary proceeds to remark : "This is a somewhat tardy

Egoism.

recognition of the fact that the development of electricity supply in new areas has been wholly arrested the last few years, and that considerable expansion is to be expected in the very near future." We do not suppose for a single instant that there was any recognition—tardy or otherwise—by his Lordship of the points mentioned. It is pretty safe to say that the Lord Chairman had statutory industries generally in mind; and perhaps the electrical industry least of all, for most of its legislative work is done by Provisional Order through the Board of Trade, and not by means of Private Bills. This is probably only a little display of egoism, which is a well-rooted failing on the part of writers in the electrical papers.

To Restrain Mr. Belling.

In last week's "Miscellaneous News" columns, we published a letter from Mr. Belling regarding the gas and electric oven tests which have been the subject of comment in the "Memoranda." Mr. Belling is not, so it seems, prepared to accept his defeat lying down. Now that the mischief is done so far as he himself is concerned—he not having improved his position in the eyes of electrical men by this escapade or piece of enterprise, whichever is the correct term—he wants to go the "whole hog," and have another shot at the gas opponent. But writers in the electrical journals seem to see in his display of courage and confidence an amount of indiscretion. They are perhaps better judges than a man smarting under defeat. But they are attempting to interfere with his personal freedom, which probably he will not tolerate. However, it is quite evident that they have no desire that he should engage in further adventure of the kind. Their boast is that they fear no foe in the cooking line; but nevertheless Mr. Belling must be restrained in his ardour for competitive tests. "Meteor" gathers from Mr. Belling's letter that he proposes to extend his activities in the matter of public competitive trials. The comment proceeds: "Electric cooking fears no rival whatever if the basis of test and comparison be just; it may be seriously prejudiced in the eyes of the public if left to spasmodic individual efforts. We imagined that the B.E.A.M.A. had more persuasive influence with its members. Mr. Belling is not only "queering the pitch" for electric cooking; incidentally, he is carrying out a public test of the B.E.A.M.A. machinery at one of the points whereon rested its *raison d'être*. We admire Mr. Belling's enterprise and enthusiasm. We differ from him radically in policy; and we certainly shall not remain passive in the matter." We may leave the matter there for the present. [The tale of these cooker tests is told with greater fulness than hitherto in an article in another column.]

Generation and Distribution Comparisons.

Attention was called in the "Memoranda" for November 19 to the absence of any proper scientific basis for comparing the efficiency of electricity generating plants. When writing to the electrical papers, Mr. C. Turnbull, makes the same point. This absence is rather strange when one remembers that the electrical engineer rather prides himself on his scientific training and rules of action. The explanation may be that he knows that to adopt a scientific basis for declaring efficiency would mean a perpetual exposure of the indigent character of the thermal efficiency of the plant. The data now published are usually all based on costs, and not B.Th.U. But as Mr. Turnbull says in regard to coal costs, one station may have the same coal costs as another, and yet be using twice as much coal—the difference arising from the price of coal delivered. In the costs tables, it is usually the generating expenses that are published; while distribution expenditure may be of greater importance. He suggests the taking of the ratio of the thermal units of the fuel to the thermal units of the electrical energy delivered to the feeders, and that labour should be reckoned as if paid at a standard rate. But he does not suggest a complete basis of comparison, preferring to leave to careful consideration the evolving of a complete system. He also makes a distinguished feature of distribution costs, which should include labour, transformer and cable losses, and, by no means least, interest and sinking-fund charges. As he remarks, if distribution costs were set out as a separate item, it would throw a great light on the reason why some stations do well while others do badly. It would also clear up many obscure points relating to super-power stations. A real dependable basis of comparison is what is wanted. It would assist greatly in the discussion of important matters which are now only treated in the most general way.

Municipal Opinion of the Regeneration Plans for the Electricity Industry.

The municipalities owning electricity supply undertakings on the North-East Coast have drawn up a long statement, and have submitted it to the Government Departments concerned, dealing with the reports of the Coal Conservation Sub-Committee and of the Board of Trade Electric Power Supply Committee. The municipalities find in the Coal Conservation Sub-Committee's report considerable bias in favour of company headship in the matter of taking-over the generation of electricity; and unprejudiced readers of the statement will find an exquisite amount of bias in it in favour of municipalities being top dogs. Naturally. And both views show the danger of not having an independent tribunal for dealing with such a controversial matter. The municipalities declare themselves favourable to the unification of the production and distribution of electrical energy, provided that the best use is made of existing stations; that there is local public control; and that proper safeguards are adopted in the interests of existing undertakings and consumers. There is protest against the attack, in the Coal Conservation Sub-Committee's report, on the policy of municipal control of undertakings. In the report they find no elements of finality, but extravagant estimates. In particular, they challenge the suggested coal saving which it is calculated will be effected. There is recognition of the desirability of establishing some central and impartial authority charged with the duty of fostering electrical enterprise. But the municipalities view with grave concern, as a dangerous extension of the policy of bureaucratic control, the proposal to confer powers (which for all practical purposes will determine the development of electrical enterprise throughout the country) upon a small body of permanent officials. However eminent individually, a small body of technical experts is, in the view of the municipalities, unfitted to be entrusted with autocratic powers of the character proposed. The first Board of Electricity Commissioners should either be appointed directly by Parliament or be constituted in accordance with directions given by Parliament, so as to secure an impartial and judicial body; and the appointment of its constituent members should not be left to the absolute discretion of the Board of Trade. The delimitation of electrical districts and the constitution of District Boards should be disposed of by direct parliamentary action after preliminary local inquiries. Then it is said to be unreasonable that any embargo should be placed upon extensions of existing electrical undertakings during any interval before the suggested super-power stations are in a position to supply electrical power. A number of other points are treated upon in this long statement—one of them being that while company distributors of electricity are to continue to exercise the right of paying dividends, municipalities are to be permitted to make no profits at all, or only a nominal profit. The municipal critics overlook the fact that they pay intesest on loans and provide sinking fund; and that what they are wanting to do is to make something in addition. They also submit that the District Electricity Boards should be so constituted as to be wholly independent of the influence or control of commercially owned electrical enterprises. To secure this object, it is urged that the District Boards should consist of representatives of local authorities and large consumers, to the exclusion of companies generating electricity. We have said enough to show that the municipalities responsible for this statement are as much opposed to private enterprise having a hand in schemes for the reformation of electricity supply as the report of the Coal Conservation Sub-Committee is anti-municipal. It is quite clear that if anything at all happens, there is going to be a sharp tussle between the opposing interests.

Electricity in Germany.

"Engineering" has been publishing some articles showing the progress of electric supply on the Continent. The survey made is spread over several countries. From the particulars given in regard to Germany, it is gathered that the development of electric power stations is more to the fore than ever; and the various States separately and within the Empire are taking an active share in the movement. At present some 74 p.ct. of Germany may be said to be provided with a supply of electric energy; and arrangements are being made to bring in an additional 18 p.ct. Both Würtemberg and Saxony have advanced the fastest in the supply of electric energy to each house; and within these countries there are only a few districts without a supply. It is stated that of Germany's 67 million inhabitants at the beginning of the war, only 10 millions were without the ability to take electricity if they desired it. But while the electricity business has been advancing, the gas undertakings were also padding their business with new custom until war circumstances intervened, as it did in both it and electricity supply, even to the extent in the latter of robbing it of copper for war purposes.

The Calorific Standard Act.—The Secretary for Scotland has received an application for an Order under the Gas (Standard of Calorific Power) Act, 1916, from the Edinburgh and Leith Corporations Gas Commissioners. The calorific power proposed is 500 B.Th.U.

New Bye-Product Coke-Oven Installations.—There has just been completed at one of the collieries of Messrs. Newton, Chambers, & Co., Ltd., a battery of 37 Semet-Solvay coke-ovens, with a washer and bye-product recovery plant. The work [which formed the subject of a long illustrated article in the "Engineer" for Nov. 22] has been carried out by the Coke-Oven Construction Company, Ltd., of Sheffield. A feature of the new ovens is that, instead of the usual 8 tons, they are each of 12 tons capacity. About 34 hours are required for the carbonization of an oven-load; so that, roughly, one oven is discharged every hour. Some 220 tons of coke are made daily. The firm have plans in hand for a new tar distillery to be operated in conjunction with the existing bye-product plant. Another recent installation of bye-product plant was described by Dr. G. P. Lishman to the members of the Northern Section of the Coke-Oven Managers' Association. This is a new battery of 35 Simplex regenerative ovens at the Lambton Coke Works, Fence Houses. The oven walls are parallel, which is, Dr. Lishman said, in many obvious ways a great advantage. It was argued that parallel walls were unsuitable for some coals; but he did not believe it.

NATIONAL GAS COUNCIL.

Meeting of the Executive Committee.

There came to hand last Wednesday morning, from the Secretary (Mr. W. J. Smith), the following statement relating to a meeting of the Executive Committee of the National Gas Council which was held on Thursday, the 28th ult., previous to the general meeting that day of the gas industry, a full report of which was given in last week's "JOURNAL."

News of the loss sustained by the Committee by the death of Mr. T. H. Duxbury was received with deep regret; and the Chairman stated that Mr. Duxbury's ability and bright and cheery presence would be greatly missed by all who had had the privilege of working with him. It was reported that a letter of sympathy had been addressed to the South Shields Gas Company.

The steps which had been taken to assist the Government in determining what should be the future composition, quality, and pressure of gas were reported; and also that, until a decision had been arrived at, it was anticipated that the regulation under the Defence of the Realm Act affecting the supply of gas would be continued.

The formation of the National Benzol Association to organize the marketing of benzol for motor spirit, and for other industrial purposes, was discussed.

It was arranged that the Council should be represented at the deputation of Lancashire and Cheshire gas undertakings' representatives to the Controller of Coal Mines on Friday, Nov. 29, in connection with the proposed amendment of the Gas Coke Prices Order. It was decided that the suggestions for a revision of the Order which the Council had received from various parts of the country should be submitted to the Controller of Coal Mines.

Further correspondence was submitted regarding the prices paid to gas undertakings for ammoniacal liquor.

A letter from the Ministry of Labour was submitted, stating that, pending the formation of a National Joint Industrial Council, the Ministry would issue instructions to all Local Technical Advisory Committees for the building trade, advising them to co-opt local representatives of the Council and of the National Union of General Workers, should advice be sought in connection with the training of disabled men in the repair and maintenance of gas and water fittings.

A meeting of the Public Utility Group of the Federation of British Industries, held on Nov. 20, was reported. The following were appointed to represent the Council on the Grand Council of the Federation: Messrs. A. E. Broadberry, F. W. Goodenough, A. A. Johnston, A. P. Main, and the Chairman of the Executive Committee. It was left to these representatives to elect two members to the Emergency Committee of the Federation.

It was reported that the Council had convened a meeting of gas undertakings of Dorsetshire, which had been held at Bournemouth on Saturday, Nov. 23. Resolutions in support of the work of the Council passed at the meeting were submitted.

A proposal for the establishment of a joint building for various technical societies was considered; and the Executive were requested to look into the matter and report to the Committee.

Proceedings at a meeting of the Emergency Committee, called to consider matters arising out of the termination of hostilities, were reported.

The draft Constitution and Rules were discussed; and the following resolution was passed:

> That steps be taken to form a Committee consisting of two representatives from the British Commercial Gas Association, the Gas Companies' Protection Association, the Institution of Gas Engineers, the Society of British Gas Industries, and the National Gas Council, to consider and report upon the best form of consolidating, amalgamating, or otherwise uniting these various Institutions into one body representative of all interests connected with the gas industry.

THE NATIONAL BENZOL ASSOCIATION.

Constitution and Rules.

In the report of the meeting of the Executive Committee of the National Gas Council which appears above, mention is made of the formation of the National Benzol Association, a copy of the Constitution and Rules of which is now to hand.

There are in all 37 rules, the most important of which from the point of view of general interest are set out below. A general meeting of subscribers is to be held at least once a year in London; and special meetings may be called under conditions set forth. The voting powers and method of election of officers are defined. The Association is to be managed by an Executive Committee, who may delegate powers to Sub-Committees. Each group of members of the Executive Committee will in their own districts call meetings of subscribers annually to nominate members for this Committee. Members of the Executive retire each year; but, if eligible, they may be re-elected. The Committee may appoint and pay a manager and secretary and other officials; and they will fix the standard for, and the minimum prices of, motor benzol, both for home and export, as well as the conditions of sale. A guarantee is to be given by members to the buyer that all motor benzol sold by them is of the prescribed standard quality. The accounts are to be made up annually to June.

OBJECTS OF THE ASSOCIATION.

3.—The objects of the Association are:

(*a*) To interest motor users and others at home and abroad in benzol as a motor spirit [hereinafter referred to as "motor benzol"].
(*b*) To sell and distribute motor benzol, whether wholesale or retail, and to obtain for it a fair market price.
(*c*) To standardize motor benzol, and to carry on, assist, and promote investigation and research with a view to its improvement.
(*d*) To purchase, take on lease, or otherwise acquire and to maintain and dispose of any property for the purposes of the Association.
(*e*) To borrow money within the limits from time to time authorized by the subscribers at a general meeting.
(*f*) To establish branch offices in any part of Great Britain or abroad.
(*g*) To promote a limited company or companies, so far as may be considered necessary or desirable, for the furtherance of the objects of the Association.
(*h*) To promote and protect the interests of members in all matters relating to the objects of the Association, including taxation and legislation, and to take such legal and parliamentary action as may be necessary therefor.
(*i*) To combine or co-operate with any society, organization, association, or company having objects wholly or in part similar to those of the Association.
(*j*) To do all other lawful things, incidental or conducive to the attainment of the objects of the Association.

4.—The Association shall consist of manufacturers of motor benzol whose businesses are situated in the British Isles and are subscribers to the Association and have signed a statement agreeing to become a member of the Association, and to be bound by the rules of the Association.

SUBSCRIPTIONS.

5.—The annual subscription shall not exceed 2s. per 1000 gallons of motor benzol, calculated on the make of each subscriber for the year ending June 30 in each year, unless such subscription be altered at a general meeting. The liability of each subscriber shall be limited to the amount of his subscription.

6.—Subscriptions shall be paid half yearly, on Jan. 1 and July 1 of each year.

7.—A subscriber shall give six months' notice, expiring on June 30 in any year, of his desire to retire from the Association; but notwithstanding his retirement, the quantity of benzol previously placed by him with the Association for sale shall remain under their control for the time that the subscriber agreed to hand it over to the Association for disposal.

THE EXECUTIVE COMMITTEE.

15.—The Executive Committee shall consist of not more than twenty members representing the following districts: *

(1) Scotland.
(2) The North-East Coast, including Northumberland, Durham, Cumberland, and the North Riding.
(3) Manchester—for Lancashire, Yorkshire (except as above), Cheshire, North Wales, and Ireland.
(4) Birmingham—for South Wales and the counties lying south of No. 3 area and north of a line drawn from the mouth of the River Welland on the Wash to the Severn at Bristol.
(5) London—for the counties lying to the south of the line drawn as above from the Wash to the Severn.

* The district areas are subject to revision.

16.—On the Executive Committee each district shall have one representative, and for each 2,000,000 gallons of motor benzol upon which subscriptions are paid, or a part of 2,000,000 gallons, not being less than 1,500,000 gallons, an additional representative.

17.—On the Executive Committee no district shall have more than four representatives.

Utilization of Coal in Austria.—It is reported in an Austrian engineering paper that an institution was founded a short time since, at a meeting attended by well-known Austrian scientists and members of Government departments, the object being the rational economic utilization of coal supplies, with the attendant recovery of bye-products (tar, ammonia, &c.), by the creation of a large-scale gas industry. This object will be attained by properly dealing with all questions relative to the gasification of coal, and by promoting and adopting plans for the establishment of big gas-works, as well as by carrying out experiments, &c. At a later meeting the hope was expressed that the steps taken would lead to far-reaching results in the direction of the proper utilization of Austria's natural resources.

Bye-Product Coke-Ovens at Hamilton (Ont.).—The new bye-product coke-oven plant of the Steel Company of Canada, at Hamilton (Ont.), will soon be in full operation. The plant consists of eighty 13-ton Wilputte regenerative bye-product coke-ovens, arranged in two batteries of forty. The contract date for the first battery to be put in operation was Nov. 15; and in spite of all difficulties, due to abnormal conditions, it was charged on the date stipulated. The date for the charging of the second battery is the 15th inst.; and it is expected that it also will be charged on contract time. The installation is complete, including bye-product plant, coal and coke handling, boiler plant, &c., and will have a capacity of, approximately, 500,000 tons of coal per annum. It was designed and constructed by the Wilputte Coke-Oven Corporation, of New York.

COMMERCIAL "CONCENTRATED AMMONIA LIQUOR" AND ITS IMPURITIES.

One of the papers presented at a meeting, at Burlington House, Piccadilly, on Monday evening of last week, of the London Section of the Society of Chemical Industry, was by Dr. Harold G. Colman and Mr. E. W. Yeoman, B.Sc., entitled "Commercial 'Concentrated Ammonia Liquor' and its Impurities."

The paper was submitted by Dr. Colman, who began by shortly describing the manufacture of commercial concentrated ammonia. He said that some little time after the commencement of the war, the demand for concentrated gas liquor increased very greatly, and plants were put down to manufacture 25 p.ct. ammonia largely intended for the production of ammonium nitrate. This type of concentrated ammonia liquor, however, contains some impurities which give a considerable amount of trouble—more especially cyanogen derivatives. It was on this account that the analyses dealt with in the paper were carried out. These analyses were of samples of concentrated ammonia liquor [the method of manufacture of which Dr. Colman briefly outlined] made by different plants all over the country—in fact, from almost all the plants that were at work. Since the armistice, the production of concentrated liquor has been very much reduced; but its output will still continue for the manufacture of ammonium salts. The analyses were made specially for the cyanogen content; but the authors also determined in a great number of cases the other impurities.

Sulphuretted hydrogen, Dr. Colman remarked, is almost always present, and is generally specified not to exceed ½ p.ct. Though some samples contained much higher amounts, in the majority the quantity varied between about 0·9 p.ct. and *nil*. A minority, however, contained much higher amounts, rising in one instance to 3·1 p.ct., evidently owing to insufficient elimination of the sulphuretted hydrogen in the pre-heating process. Frequently carbonic acid is entirely absent; and when present, it is in most instances only in small amounts. There were instances in which up to 11 p.ct. was found; and such excessive amounts are also due to inadequate treatment of the crude liquor in the pre-heater. The liquor always contains phenols; and in a few samples tested the figure varied from 0·11 to 0·37 gram per 100 c.c. Similarly pyridine bases are always present; and the amount found in a few samples was from 0·23 to 0·32 gram per 100 c.c. In addition, there is invariably a certain amount of ammonium thiosulphate; figures obtained from a number of different samples indicating that the quantity varies from 0·08 to 0·25 gram per 100 c.c.

As he had already stated, the main point of the investigation was the question of the cyanogen content of the liquor. There may be ammonium cyanide, ferrocyanide, and thiocyanate present; but the tendency is for the cyanide to disappear rapidly by conversion to ferrocyanide and thiocyanate—the last-named being often the only recognizable cyanogen compound. There are two sources of thiocyanate—hydrocyanic acid, and the carbon bisulphide usually present in the distillation gases from the still (and formed from the ammonium thiocarbonate always present in the crude liquor), which is absorbed in the concentrated liquor, with re-formation of ammonium thiocarbonate. This, on standing, undergoes slow change; one result being the formation of thiocyanate.

Out of a large number of analyses, the authors selected for inclusion in tables ten samples from gas-works and a similar number from coke-ovens; all the other samples tested giving results falling generally within the limits of these. The quantity of free ammonium cyanide in the samples as received was either *nil* or very small in amount, owing to conversion having already taken place into ferrocyanide and thiocyanate. The amount of ferrocyanide in the gas-works liquor is very small, but is often much larger in samples made from coke-oven liquor. The total hydrocyanic acid is on the average much higher in coke-oven than in gas-works liquor; and in very few of the whole of the samples was it so low as the desired figure. In considering this matter, it has, of course, to be remembered that many of the plants were put up under very great difficulties; and so one could not expect the same results as where people had been making concentrated liquor for a number of years. The reason why coke-oven liquors should be so much higher in cyanogen compounds than gas-works liquors arises from the fact that the ordinary crude ammoniacal liquor from the coke-ovens almost always contains more free ammonium cyanide than does that from gas-works. In the latter, the crude liquor is generally stored for a considerable time before being distilled; and in the interval, by the action of the oxygen in the air, the free cyanide is mostly converted into thiocyanate. Coke-oven plants usually have more limited storage capacity; and the liquor has to be distilled almost as soon as produced.

Discussing the possibility of improving these concentrated liquors, Dr. Colman remarked that one of the most important points is the treatment of the crude liquor in the pre-heating process, to ensure a good removal of the carbonic acid and sulphuretted hydrogen. This pre-heating process, which is very interesting, had recently been dealt with to a considerable extent in a paper prepared by Mr. P. Parrish.* The purity of the liquor does depend very largely upon the pre-heating process. Another matter which very much affects especially the cyanogen impurity, is the addition of lime in distillation in sufficient quantity to ensure that at all times the whole of the fixed ammonium salts are decomposed. If this is not done, there is no question that cyanogen impurities carried forward into the concentrated ammonia are very materially increased. A further plan tried is the passing of a stream of air along with the steam through the ammonia still during the distillation process; the hydrocyanic acid being converted into thiocyanate, which passes away with the waste liquor. A still further method is the treatment of the gases passing from the still, between that point and the reflux condenser, with some agent which will remove all the hydrocyanic acid. A mixture of ferrous sulphate solution and caustic soda has been successfully employed. In some cases, a lime-washer is already put in at this point, to absorb any sulphuretted hydrogen and carbonic acid which have not been removed in the pre-heater; while adding sulphur as such, or in the form of spent oxide, to the lime, tends also to retain the hydrocyanic acid as thiocyanate.

The final portion of the paper explained in detail the methods of analysis employed, which were in general those given in the reports of Mr. Linder (Alkali Inspector) for the analysis of crude ammoniacal liquor, modified where necessary to allow for the much larger quantity of ammonia present in the concentrated liquor.

* See "JOURNAL" for Nov. 19, p. 413.

DISCUSSION.

The CHAIRMAN (Dr. C. A. Keane) remarked that Dr. Colman had presented the subject in a most complete manner. For a type of industrial investigation, it appeared to be practically ideal. Both Dr. Colman and Mr. Yeoman were to be congratulated upon the results that had attended their work.

Mr. PARRISH remarked that he had had occasion to use the air method for the fixation of cyanides, and could confirm all the authors had said in regard to the efficacy of it. There was, however, one possibility in connection with the adoption of this method which might prove a difficulty. He did not know to what extent Dr. Colman recommended the application of air, nor to what extent the volume of the waste gases leaving the dissociator increased; but it seemed to him that if the dissociator was in direct contact with the sulphuric acid plant—*i.e.*, the spent oxide burners—the sulphuretted hydrogen and carbon dioxide which were passing forward, and which were burned in the spent oxide burners, might bring with them a quite conceivably large percentage of diluent gas in the shape of nitrogen and oxygen. This might constitute a distinct drawback from the point of view of intensive working of the sulphuric acid plant. He had been hoping to hear from Dr. Colman some comments with regard to the application of this very comprehensive investigation to the possible utility of concentrated ammonia liquor in lieu of liquor ammonia in the process of oxidation of ammonia to nitric acid by a platinum catalyst. On the other hand, the Americans had declared, and confirmed it on frequent occasions, that neither the hydrocyanic acid, the sulphuretted hydrogen, the pyridine, nor the carbon dioxide had any inhibiting effect on the platinum catalyst. We in this country, on the other hand, were very diffident about using concentrated ammonia liquor. Personally, he hoped to put into operation very shortly a plant working on commercial concentrated ammonia liquor, not specially purified; and this should give an opportunity of confirming a number of the data which had been brought forward in the paper. The intention was simply to operate a vaporizer through which the requisite quantity of air would be blown by a fan; and in this way it was quite conceivable there would be a very rapid oxidation of the ammonium sulphide and the fixing of any volatile hydrocyanic acid that might result. He hoped that the plant would realize many of the favourable anticipations which the paper led him to think might result. He would not be inclined to recommend, nor, indeed, would he countenance, the use of spent oxide for the fixation of the cyanides. When he applied the air method three years ago, he suspected that it was the cause of a perceptible dilution of the gases going forward to the sulphuric acid plant, and it interfered with the intensive working of the plant. He therefore turned to the use of sulphur, which lent itself to ready application to the dissociator. But he found it was necessary to employ something of the order of 1 p.ct. of sulphur per ton of concentrated ammonia liquor, in order to fix the cyanides to such an extent as to keep them below the limit of 0·01 p.ct. as NH_4SCN. This represented 22·4 lbs. of sulphur with a sulphur content of about 99 p.ct. If spent oxide was used, the sulphur content was only about 45 p.ct.; and this meant using something of the order of 50 lbs. of spent oxide in order to secure the fixation of the cyanides to such an extent as to conform to the specification of the Ministry of Munitions. He was certain that if the use of spent oxide had been carried on for a week, difficulty would have been experienced by the blocking of the serrated edges of the decomposing still, and much more frequent cleaning than usual would then have been necessary.

Dr. R. LESSING asked whether there was any relation between the pyridine basis and phenols. When one went up, did the other go down at the same time? When working out a process for the recovery of pyridine from "devil" liquor by means of oil-washing, which he (Dr. Lessing) had patented jointly with the late Colonel T. Wilton, he had found that phenols had a particular attraction for pyridine, and facilitated its recovery. The investigation of pyridine bases in connection with ammoniacal liquors appeared to be of great interest at the present moment, since pyridine had been traced in the gas right through the purifiers; and it was altogether a difficult thing to deal with in ammoniacal liquor. As to adding substances to the liquors to get rid of cyanide, had the addition of iron sludge in the dissociator or before heating been tried? It could be added in quantities not much exceeding the actual quantity of hydrocyanic acid, and would probably effect the conversion of some of the hydrocyanic acid. It was a somewhat modified proposal from that mentioned by Dr. Colman, where the vapours were washed with ferrous sludge, after leaving the still.

Mr. H. HOLLINGS inquired whether the difference in the quantities of hydrocyanic acid in coke-oven and gas-works plants had been found to be due to any extent to the different carbonizing installations.

Dr. COLMAN, in reply, said he could not state anything about the

effect on platinum catalysts of using concentrated liquor. With reference to Mr. Parrish's remarks as to spent oxide, he was not quite sure that they were not talking of different things. He (Dr. Colman) was speaking of where they had a lime-washer for removing CO_2 from the gases in the still.

Mr. PARRISH said his impression was that Dr. Colman had suggested the introduction of spent oxide to the condenser, and not to an intermediate vessel, interposed between the ammonia still and the condenser. He (the speaker) had had an opportunity of installing a vessel between the ammonia still and the dephlegmator—operating practically on the principle of the Williams sulphocyanide process. The arrangement he had made was to insulate the vessel in order that it should retain its heat, and thus prevent any undue condensation; and this was remarkably effective. He was able to reduce the sulphocyanide in the liquor to something of the order of 0·008 p.ct. Therefore he quite appreciated that the addition of spent oxide, at the point at which he now understood that Dr. Colman recommended its application, would be effective.

Dr. COLMAN, (continuing) said his own belief was that, with proper attention to the pre-heater, proper working of the still, a sufficient quantity of lime, and a small amount of air, the hydrocyanic acid could be kept down to quite a reasonable figure. These plants were in many cases emergency plants; and one had to do lots of things which one would not recommend as regular procedure. Putting spent oxide into the lime-washer was one of these. The addition of iron sludge for a fixed alkali, so far as his experience went, did not seem to have the required effect. Mr. Hollings had asked whether there was any reason to suppose carbonizing conditions in coke-ovens were such as to give a higher amount of hydrocyanic acid than was obtained under the carbonizing conditions in gas-works. He had not made anything like a large number of tests with hydrocyanic acid in coke-ovens; but his experience was that hydrocyanic acid under gas-works conditions was distinctly higher than it was from gas made in coke-ovens. Neverthnless, the actual amount of free cyanide in coke-oven liquor was much higher than in gas-works liquor, because gas-works liquor was stored, and the free cyanide got gradually converted into thiocyanate before it was worked up.

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

Visit to Wallasey.

On Saturday, about thirty members of the Association visited the gas-works belonging to the County Borough of Wallasey. The party were welcomed by the Mayor, Mr. W. Eastwood (who formerly, for a period of five years, was Chairman of the Gas Committee), Mr. W. S. Chantrell (the Chairman of the Gas Committee), and Mr. J. H. Crowther (Engineer and Manager), and his Assistant, and Mr. G. Dixon, B.Eng. Before the inspection of the works, Mr. Crowther told the party that Mr. Dixon had been very busy with the chalk, and as they went round they would see that much condensed information regarding plant and capacity had been written on the apparatus; so that if they were unable to get near enough to the guide to hear what he was saying, they would have a good idea of what was taking place on the works. This effort on Mr. Dixon's part was highly appreciated, and proved of considerable assistance to the visitors.

Some two hours were spent inspecting the works, after which the party were conveyed by special car to the Town Hall, where they were entertained at tea. Afterwards, an adjournment was made to the Council Chamber.

A VOTE OF THANKS.

Mr. A. L. HOLTON (Manchester) said that to voice their expression of thanks for the kindness and hospitality shown them that afternoon was a difficult task. This was their first meeting since the signing of the armistice. During the past four years, there had been many difficulties for the gas engineer to face. In going round the works, they had heard where alterations and extensions had been held up on account of the war. It was a very pleasing duty to propose a hearty vote of thanks to the Mayor, and the Chairman and Members of the Gas Committee, and to Mr. Crowther, for their kindness to them that afternoon, and to Mr. Dixon and the Chemist (Mr. F. Watson).

Mr. H. BUTTERWORTH (Blackley) seconded the vote of thanks, and added that in his opinion the visit was one of the most successful the Association had had.

The MAYOR, in returning thanks, said it had been a mutual pleasure to have the Association at their works. The Wallasey Corporation had always shown that spirit which was the forerunner of progress and enterprise. He hoped the inspection would produce beneficial results.

Mr. CHANTRELL remarked that whatever he knew about a gas-works was due to Mr. Crowther. As Chairman of the Committee, and as a business man, he could see a tremendous opening for the gas industry. He considered that the industry would be ten times more valuable than it was even at the present time.

Mr. CROWTHER said he was sorry the visit had not been arranged for the summer time. Then they would have had the opportunity of seeing some of the area supplied and the beauty of the surrounding districts. He did not want any thanks for what he had done, it had been a pleasure to have the Association there. He was pleased that Mr. Dixon had been included in the vote of thanks. The Engineer could not get on without good assistants. The Presidential Address, to be considered later, dealt with labour questions. Their men had done well during the strenuous times.

A discussion then took place on the address delivered earlier in the year by the President (Mr. C. E. Teasdale, of Salford). The report of this portion of the proceedings is held over until next week.

THE WALLASEY CORPORATION GAS-WORKS.

A Brief History and Description, Prepared by Mr. J. H. Crowther, Engineer and Manager.

The Local Authority have been supplying the inhabitants of the borough of Wallasey with gas over a period of close upon sixty years The area of the borough is 3408 acres, and includes the townships of Wallasey, New Brighton, Poulton, Egremont, Liscard, and Seacombe. Owing to the very rapid growth in the population [at present estimated at 87,000], and the consequent demand for gas—the output having been doubled every decade—it has been essential to carry out from time to time very extensive alterations and additions to the plant, works, &c., which has been done on an adjoining site. The original works, though still intact, are out of use. Wallasey being a residential district, the rate of increase in the output of gas has been checked by the exigencies of the war, daylight saving, and the operation of the Household Fuel and Lighting Order. The output for the twelve months ended March 31 last was 765 millions. Comparing the past seven months with the corresponding period of last year, the output has been reduced by nearly 4 p.ct., due to the reasons just mentioned.

CARBONIZING PLANT.

The new or extension works are divided into two sections—horizontal retorts with stoking machinery, and a continuous system of vertical retorts. The horizontal section consists of three benches, each bench containing six ovens of nine through retorts 20 ft. 9 in. by 21 in. by 15 in. ⏢-shape, making a total of 162 retorts, equal to a carbonizing capacity of 200 tons of coal per day. The settings are of the regenerative type, with one producer to each oven, and fitted with step-grate furnaces throughout. Each oven has its hydraulic main, and each bench is provided with a tar-column.

The vertical retort section consists of six settings—a total of 24 retorts—equal to a carbonizing capacity of 120 tons of coal per day, and is on the continuous system.

RETORT-HOUSE MACHINERY.

The power house contains three horizontal gas-engines direct coupled to D.C. generators, working at 220 volts. Two of the engines are of 90 H.P. each, and one of 45 B.H.P. There is the usual switchboard, with generator and distribution panels, switches, fuses, &c. Coal-wagons are brought to the sidings alongside the retort-house, and tipped by an electrically-driven direct-geared single-ram wagon lifter fitted with cradle to raise the wagon clear of the buffers. The coal falls through the end door directly into the hopper leading through the jigger plate into the coal-breaker, of 30 tons per hour capacity. In the case of the verticals, the coal is elevated by means of a gravity bucket conveyor, delivering the coal or coke into the bunkers. In the horizontal house, the coal is tipped in a similar manner into the breaker, and an ordinary bucket elevator delivers to the push-plate conveyors, which travel along the full length of the continuous bunkers.

The stoking machinery discharges at one stroke, and charges the retorts in three shots. It is made for 10 cwt. charges of eight-hour burning. The coke is carried away to coke-screens or the store yard by means of an overhead telpher mono-rail. There is a coke-screening plant, consisting of a gravity bucket elevator and jigger type coke screen of 30 tons per hour capacity, arranged for breeze, two different sizes of round coke, and suitable for loading into railway wagons. The whole of the coal is brought from the main railway line over the Corporation's branch railway, and in the works it is handled by their own locomotives.

PURIFICATION PLANT.

The horizontal and vertical sections are quite distinct. For the horizontals, there are 24 annular type air condensers, which can be split up into four sections. There are two three-blade exhausters, each of 40,000 c.ft. per hour capacity, and one 80,000 c.ft., governed by steam gas regulators; two Livesey tar extractors, which can be worked singly or in series, each capable of treating 1½ million c.ft. of gas per day; two tower scrubbers, 30 ft. high by 12 ft. diameter; an eight-chamber rotary brush washer (at present four of these chambers are being used for oil washing for benzol); a set of purifiers of the water-lute type, each 30 ft. by 20 ft., and four dry-seal purifiers, 35 ft. by 25 ft. Natural oxide and horizontal type grids are used throughout.

STATION METERS.

There are two 80,000 c.ft. per hour station meters.

VERTICAL SECTION.

In connection with this section, there is one set of eight annular tube condensers, and two water-tube condensers working in series; two three-blade exhausters, each capable of dealing with 80,000 c.ft. per hour, governed by steam gas regulators; two "P. & A." tar-extractors, working in series, and one Livesey tar-exractor, which was put down for tar washing for toluol; one eight chamber rotary brush washer, and one four chamber; four dry-seal purifiers, 40 ft. by 30 ft.; one station meter of 80,000 c.ft. per hour capacity.

After passing the station meters, the gas from the horizontals and verticals is mixed. The gasholders are common to the whole. These comprise: One small two-lift holder of 250,000 c.ft. capacity, which is used for testing purposes; one rope-guided holder of 1 million c.ft. capacity; one four-lift frame holder (with one flying lift) having a capacity of 1½ million c.ft.; one four-lift spiral-

guided gasholder of 1½ million c.ft. capacity. The total storage capacity is 4¼ million c.ft., or 1¼ days' maximum supply. The two latter holders are fitted with anti-freezing apparatus; and a separate boiler is provided to give steam for this purpose. There are three station governors—two of 30 in. diameter and one 24 in. The sulphate of ammonia plant, with boiler complete, is capable of producing three tons of salt per day. There are the usual workshops, smithy, and joiners' shops for machinery repairs. Gas meter and cooker repairing and cleaning shops are also situated on the works.

About two years ago a benzol extraction plant was erected. The building containing the plant is of reinforced concrete, with an overhead tank, where water is circulated and cooled for condensing purposes. The gas from the horizontal retorts only has been treated for benzol; and an extraction of 1¾ gallons per ton of coal has been obtained. There are four Lancashire or two-flue boilers, 25 ft. by 7 ft. 6 in. diameter, providing steam necessary for the exhausters, circulating pumps, and engines for washers and benzol plant. There is on the works a tar plant, which is let to contractors, who carry out distillation to suit their own market.

What is known as the "Old Works," containing some direct-fired settings, and a bench of regenerators containing 72 single back-to-back retorts, 21 in. by 14 in., together with the plant necessary for purifying the gas, is still retained intact, although not used, as the stoking is hand work, and the plant is not so up to date as that previously described.

Petrol motor lorries are employed for the distribution of coke, and also for work in the district in connection with the main and service laying, cookers, fires, &c., supplies.

YORKSHIRE JUNIOR GAS ASSOCIATION.

The Fifteenth Annual Meeting of the Yorkshire Junior Gas Association was held last Saturday afternoon, at the Chemical Lecture Theatre, Leeds University—Mr. E. GARSED (the President) occupying the chair.

THE LAST WAR-TIME PRESIDENT.

The PRESIDENT said they met for the first time for four years under happy peace conditions, and he felt thankful to retire from the chair as the last war-time President. His last message as President was a feeling that the Association was in need of some little revival. The new officers would look to the general membership to support them in maintaining the vigour of organization which was necessary in any circumstances, and particularly so to meet the problems of the reconstruction period.

ANNUAL REPORT.

The annual report, submitted by the Hon. Secretary (Mr. W. H. Riley) stated that seven gatherings had been held during the session, at which good attendances had been maintained. The ordinary membership of the Association was now 125; being an increase of three during the year. So far as was known, 30 members were serving with the Colours. In addition to the general meetings, four Council meetings had been held during the year. The Council, on behalf of the members, thanked the engineers of the various works which had been visited during last season. Hearty congratulations were extended to Messrs. A. F. Ames, A. Edwards, J. W. Fell, G. Herris, J. E. Holiday, and F. Peel on promotion gained by them in the industry.

The financial statement, prepared by the Hon. Treasurer (Mr. Peter M'Nab), showed a deficit on the year's working of £3 15s. 7d., which would be slightly larger if the cost of the private "Transactions" was higher than last year. The reason of the deficit, of course, was the donations of £5 each to the Y.M.C.A. and the British Red Cross Funds last winter; and they had no regrets on this score.

The report and financial statement were adopted, on the motion of Mr. W. W. OTLEY (Normanton), seconded by Mr. F. PEEL (Brighouse).

On the motion of the PRESIDENT, seconded by Mr. M'NAB, a vote of hearty congratulation was passed with Lieut.-Col. J. Kennington, of Grimsby, M.C., D.S.O. (a member of the Association), on his recent promotion and his award of the latter-named honour.

INDUCTION OF NEW PRESIDENT.

The PRESIDENT then formally introduced his successor, Mr. E. L. OUGHTON, of Longwood—who, in taking the chair, appealed for increased support of the members for the officers. The Association was not without the ability and knowledge in the industry among its membership which went to make a successful Association. Junior associations were, to some extent, more intimately in touch with the working of the industry than were the senior associations. He hoped there would be a real rally together to make the new session the most successful in the history of the Association.

Mr. OUGHTON then delivered the following

PRESIDENTIAL ADDRESS.

Gentlemen,—I thank you for the honour you have done me in electing me President of the Association. Over four years of strenuous war conditions has shown that the gas industry cannot afford to live upon past achievements or reputations, however creditable. The reflex following this chaotic period will test the stability of every commercial undertaking, revealing inherent weakness or strength. To-day, actions are recorded; to-morrow, the interpretation and judgment. We cannot hope to obtain identity of conclusion; but harmony of aim we must have if there is to be success. Present events portend greatly increased competition in the future; and the younger men must impart their own personality, together with an indomitable will, into the work they undertake, and not merely copy others.

The future leaders will, by a natural law, be drawn from the unknown and obscure juniors of to-day, who will dare to be themselves. May this and other Associations produce such men to add to the laurels already won—live men, who will not subordinate business to pleasure and self-gratification. The future of the gas industry will not be then a parallel to the tragic examples of decadence seen in the once great early world powers. Fields will open ere long for the exercise of ability on the Continent, where many gas-works and their distribution systems have been wrecked beyond repair. At home, there are ample opportunities now, and there will be many more after this period of war, for the younger men to prove their worth. The demand for extensive housing schemes all over the country make it incumbent that all should be alert and give of their best in the interests of the industry they work and strive for. It is proposed in this address to suggest spheres for increased activity and development, with reminders which tend towards raising the general standard of efficiency in the commonplace operations performed daily in the distribution and sales departments.

THE STATION GOVERNOR.

The first consideration is the station governor and its relation to the distribution system. Ignoring the lower pressures of to-day, due to the exigencies of circumstances brought about by the fuel shortage, considerably higher pressures are imperative in most districts, as the demand for gas, particularly at certain hours of the day, has grown abnormally in comparison with the carrying capacity of mains. If the pressures on the district are too low, a general loss of efficiency at the burners and appliances is inevitable; and the sales of gas are less than they should be. On the other hand, pressures too high accentuate main and service leakage, and increase the percentage of loss. Leakage is proportional to the square root of the pressure. [Attention was drawn to a curve showing increase of leakage from an assumed loss of 350 c.ft. per hour from 1 in. to 6 in. pressure.]

A more general use of governors fixed on lighting services and at each appliance will greatly increase the general efficiency. It is, however, necessary for the governors to be set by the gas undertaking after a diagrammatic pressure chart has been taken for twenty-four hours at least, and the outlet pressure set accordingly. The absence of this has probably been the root cause of much unsatisfactory working and discontinuance of governors in the past.

MAINS AND SERVICES.

It is taken for granted that an accurate plan of the whole distribution system is kept, and brought up to date as extensions and alterations are made. Ordnance survey maps to the scale of 1/2500 are generally used for this purpose; but it is a great advantage if the whole is subdivided into sections upon a 1/500 O.S. map, as greater detail can be shown. If this is not done, the time lost in tracing mains and services will run into a large account.

It is desirable to foster amicable relationships with all the authorities who have the right to open-up roadways—viz., the highways, sanitary, water-works, and electrical departments. This should be very easy in the case of municipal undertakings; but with private companies, it is not always so. There should be a mutual understanding to notify each other of damage caused by their men, or of defects noticed when executing work in proximity to mains, drains, cables, &c. Where a gas undertaking has high-pressure steel mains, this is to their special advantage; for it is quite easy to have the jute covering damaged by pick or spade. Should the ground be unfavourable, speedy corrosion follows, entailing premature renewals. Periodic surveys of mains and services are a necessity. It is startling how soon defects develop, especially in services, due to insufficient protection when laid in an indifferent subsoil.

Naphthalene troubles are often accentuated by careless or inefficient workmanship—square elbows even being used in place of bends. Pipe ends not being reamered before screwing together leave a jagged edge inside, and so assist in collecting the deposit.

METERS.

The reports of the Meters Research Committee have directed serious attention to the question of meters, and provided much food for thought in relationship to unaccounted-for gas. The following indicate causes of efficiency loss in this section:

Meters reading slow . .	A direct loss to the undertaking.
" " fast . .	Initial gain; but loss often results through dissatisfied consumers.
Meters not registering . .	Indirect loss generally, because of complications and explanations needed, with often unsatisfactory ending.
" not passing gas .	Direct loss of revenue.
" leaking	Direct loss and possible accident.
Changing meters. . . .	Direct loss if full particulars are not known regarding type and size of unions, through use of gas curtailed, and double journey for workmen.

Periodic meter testing *in situ*, in conjunction with the meter inspectors' reports and office scrutiny of consumption, will eliminate much direct and indirect loss. The results analyzed in the case of those working slow and the approximate loss for one year calculated will, while alarming the most complacent, amply repay with interest the labour charges involved. [Attention is

directed to a chart showing the cost of testing various meters *in situ*, and the saving effected in one year.]

PUBLIC LIGHTING.

Severe competition in this sphere demands the highest efficiency if business is to be obtained and retained. This is more easily effected in new installations, though there are splendid conversion sets on the market which give a lighting efficiency practically equal to new lamps. The use of automatic controllers with bye-pass, in wind-proof lanterns (a very important point), save much labour and maintenance costs, and can be relied upon to give good service.

Before deciding upon automatic controllers, the fullest details as to district pressures are necessary. For some areas the pressure-wave type may be the more suitable, while in others only clockwork controllers give satisfaction.

When street lighting is taken under a definite specification as to minimum illumination—though the direct ray foot candle values based on candle power is the better method—great care must be taken in deciding upon the type of lamps to meet the requirements. Careful discrimination is needed in deciding between the high pressure and the superheated type of low-pressure lamps, as initial outlay, maintenance, and renewals are important factors. If this is done, and impartiality assured, gas has no need to fear the most stringent tests for any kind of street lighting.

PRIVATE LIGHTING.

This is a most important field, and must not be surrendered merely on the grounds of sentiment or insufficient knowledge on the part of the public as to the potentialities and actualities of gas as a twentieth century lighting medium. Gas undertakings have every opportunity of demonstrating the economy, efficiency, and suitability of gas for all classes of consumers. The following points should be kept well in mind as converters of possible losses into positive efficiency: It is essential that gas-switch installations should be recommended wherever possible. The provision of lighting units suited to size and surroundings of each particular room. There is ample range from 16 to 100 c.p. and upwards, in gradually advancing stages. [This was indicated on a chart.] Why should a 90-c.p. burner be supplied for a pantry, bathroom, or other small apartment when a smaller unit is available, and so obviate excessive gas consumption and increased cost of mantles and glassware? For several years at Longwood we have fitted medium nozzles to large-sized burners, and so materially reduced breakage in glassware. This specially applies to pendants having two, three, or more burners.

Free periodical maintenance (charging only for materials used) gives opportunities for minor defects to be remedied before they cause dissatisfaction and possible loss of business. The absence of this practice, while saving labour costs, invariably leads to greater, and often permanent, loss of patrons. Only reliable high-class burners having renewable gas and air regulators and nozzles, and suited to the gas sent on to the district, should be stocked. High-grade mantles, sold under a reasonable guarantee, will bring business and satisfaction. Stocks of every type of mantle, glassware, and burner accessories in use should be kept. More care and expert advice should be given in the choice of glassware. If prismatic shades were more recommended and suitably applied, scientific lighting would soon be brought more into the domestic domain, instead of being limited to works and public buildings. Schemes of combined lighting and ventilation should be freely submitted, and brought before architects and the local authorities interested.

APPLIANCES.

It is a fundamental law that the appliance should be of the size and type required to perform the necessary work. A visit to the premises where appliances are to be fitted is necessary; for so many factors have to be taken into consideration which govern the effectual use or otherwise of the appliance. When apparatus is sold indiscriminately, this is endangered. While technical supervision is a necessity, it must be supplemented by trained men for doing the work, who know not merely how to fix it, but why; for untrained men often cause direct loss in addition to dissatisfied consumers. It is regrettable that the Plumbers' Association view with such distrust the Gas-Fittings Course of the City and Guilds of London Institute, as the acceptance of the necessity for the course undoubtedly would be to the advantage of gas undertakings, the public, and master plumbers themselves.

The day is passed for ever when the gas industry could afford to ignore the colossal waste of gas through inefficient appliances, and almost vie with the mustard manufacturer who is reputed to have made his profits from the mustard wasted and not used. Every cubic foot of gas must give maximum duty in the appliance in which it is used. The confidence of the consumers must be retained by creating an atmosphere of trust through pleasant memories of full satisfaction having been given. This is quite within reach; for, as in lighting units, there are appliances suited to any condition required.

THE VALUE OF A REPAIRING SHOP.

In connection with this section, it may be of interest to point out the immense saving which accrues in having an up-to-date repairing shop, where the various appliances can be taken to pieces, thoroughly cleaned, re-enamelled, rebuilt, or remodelled. The high cost of renewals for appliances on the hire list is known to all; their cost being much more than a new cooker itself. When facilities for rebuilding are available, three old cookers may often be converted into two—thereby saving the cost of two new ones, less the scrap metal of three, which would otherwise be discarded. Double-cased slot cookers may, with slight alterations, be made to suit the most fastidious cook; and the Yorkshire housewife, it is believed, holds the palm for knowing and appreciating a good cooker. The cost of rebuilding packed cookers from otherwise unrepairable ones, as before mentioned, varies from £1 to £2 10s. each. This is good business, when the rebuilt cooker goes out on terms equal to those costing £4 to £8. Similarly, older pattern gas-fires can, at an equally moderate cost, be remodelled, made noiseless and hygienic, and retake their place on the hire list. Other appliances can be likewise treated.

GAS-ENGINES.

Gas-engines for power purposes are potent factors in competition, and when placed out under suitable conditions are most reliable, economical, and efficient. In the majority of cases they prove to be the cheapest power when every factor is fairly considered. As in every other branch of distribution, a consumer may be a source of profit or a perpetual trouble; and due care must be taken, and technical skill exercised, when advising as to the installation of a gas-engine, whether small or large, if positive efficiency is to be assured.

Here are some practical considerations and observations noted in one's own experience: A reliable type of engine must be recommended, and initial cost should not be the sole deciding factor. An engine too small or too large for full duty must not be fixed; for the maximum efficiency is only obtained when running on full normal working load. Where load is intermittent, variable admission governors should be advised. Magneto ignition is a great advantage when the engine is only working for short periods during the day. The type of drive best suited to requirements should be noted, and transmission losses allowed for. Inadequate or improperly laid engine foundations must be avoided. A simple test is to balance a penny on edge at different parts of the engine when running. Efficient cooling is imperative where constant running is necessary. Periodic inspection, maintenance, and indicating should be undertaken wherever possible by the gas undertaking. Full instructions should always be supplied to the engine attendant and a hearing given to his difficulties, however trivial; for he may turn a profitable customer into a direct loss. Gas-engines should be sold on hire-purchase to suit clients. In many districts placing them on simple hire will prove very profitable where electrical competition is keen. The whole work in connection with a gas-engine installation should, if at all possible, be carried out by the undertaking supplying the gas, in conjunction with the makers of the engine.

When one peruses the lists of gas-engine makers, it is striking what diversity of standard measurements, rating, and definitions are seen. One maker will state that B.H.P. and consumption are based upon a calorific value of 700 B.Th.U., another upon 700 to 500 B.Th.U. The former is hopelessly behind modern practice, even in pre-war days, and the other surely does not expect to obtain identical results and efficiencies per foot of gas at these different values. Similarly confusing terms may be noted in the rating. Some are given as maximum B.H.P., others normal H.P. or working load—thus misleading many purchasers. The variations in speed are very great, and also the net weights of similar engines, and capacity of cooling tanks; while the size of standard pulleys varies from almost every maker.

Referring to charts relating to some of these differences, the speaker remarked that surely they suggested that, if there were more uniformity, much trouble would be avoided and a more general efficiency of service secured. The tendency of some makers to place engines on the market from the commercial standpoint only, and neglect the technical perfection which was the aim of a few, was to be regretted.

PROPAGANDA.

Propaganda work will necessarily have to be of a different character to meet the altered conditions brought about by the war, and success will only come to the progressive. The British Commercial Gas Association deserve praise for the admirable work they have done, and are doing, to lead public opinion to realize the immense importance of town's gas.

HOUSEHOLD FUEL AND LIGHTING ORDER.

It is to be hoped all juniors have followed closely the much that has been said and written relating to the fuel equivalents of the above Order. This is a crisis in the history of gas, and will have its sequel in days yet to come. Those who have been in contact with the public during the preliminary workings will have noted immense advantage where they have been systematically educated to the value of gas as a fuel in the past. The innumerable conversations with heads of households, who otherwise are too busy to interest themselves in domestic cares, have given priceless opportunities to the vigilant.

LOWER GRADE GAS.

It is quite evident that the trend of opinion is towards a gas of considerably lower calorific value than that of pre-war days; but transformation cannot be effected without increasing the activities of the distribution staff. Much greater attention will have to be paid to the question of pressure; for it will be imperative that adequate pressures be maintained. It will also mean a readjust-

ment of incandescant burners, cookers, fires, &c.; and whether an absolutely new type of hot plate for cookers will be necessary is a matter which can only be determined when the problem of calorific value has been settled.

A VOTE OF THANKS.

The PRESIDENT added, in regard to spraying, that since the preparation of the paper, he had tested eight meters, varying from 7·5 p.ct. slow to standing. After spraying, five were correct, and three still had not registered with one light. In regard to the value of gas as an aid to natural ventilation, he quoted a case of a club in his own town at which his undertaking, as a result of what the officers of the club saw in the show-room window, had installed a burner under the outlet of the club ventilator, and thereby effected a cure for ill-ventilation which the club had spent a good deal of money in trying to secure by other means. The success of this installation had brought several other similar jobs. He quoted from a paper delivered to the Association by Mr. Peter M'Nab, in March, 1910, as follows: "The dry meter is affected by the dryness of the gas absorbing oil from the diaphragms, thus allowing the gas to pass through the pores and be consumed unregistered. The valves must also suffer in this case, as the gas has generally been relied on to contain sufficient lubrication for them."

Mr. GARSED said the President's address had been a real refresher, and he hoped the same spirit and standard would be maintained throughout the session. He did not propose to ask for questions on this occasion, because it was understood that this particular address was to be the subject of an informal and unpublished discussion later during the session, when those members who were shy of publicity would have an opportunity of giving their views. He hoped they would all read up the paper in the "JOURNAL," and be well primed with questions and points for the occasion.

Mr. M'NAB, in moving a vote of thanks to the President, remarked upon the coincidence of Mr. Oughton's quotation from his (Mr. M'Nab's) paper of March, 1910, in view of the fact that he (Mr. M'Nab) had, in a letter addressed to the "JOURNAL" * quoted the very same passage, in challenging observations made in the article by Mr. Norton H. Humphrys in the "JOURNAL" for Dec. 3, on "What is the Truth about 'Stripped Gas'?"

Mr. W. H. RILEY, in seconding the motion, remarked that on the two occasions on which he had heard communications by Mr. Oughton he had been struck by the careful way in which he always tabulated his facts and figures.

The resolution was cordially passed.

DEMOBILIZATION.

Mr. E. J. SUTCLIFFE (Bradford) drew attention to the need for the Association to do something in the way of attempting to secure the early return of the young men of the industry who had joined the Forces. They had gone to serve the country at a critical time in their own careers, when they were training and studying for their profession, and had lost a big slice out of their training time. Their case was more serious than that of the artisan apprentice, who could easily take up again the hammer and chisel. These men had to do brain work as well as other types, and had to keep in touch, through the Technical Press, with all developments as they occurred. They would be entirely out of touch when they returned, and thereby badly handicapped. An Association like theirs ought to do something to try to get them out very early, so that they might quickly pick up the threads again. He supposed all the undertakings were making out the usual application forms; but he did not think these were likely to bring back the men particularly soon.

Mr. M'NAB suggested that the University authorities might be approached, to use their influence. It was a matter which concerned them in many industries.

Mr. SUTCLIFFE remarked that the majority of the young men would expect to come straight back into the industry; but, being out of touch, they would be at a great disadvantage.

The PRESIDENT suggested writing to the Secretary of the Joint Council of Junior Gas Associations, so that the matter could be sent forward to the National Gas Council.

Mr. E. GARSED moved that the matter be dealt with by the Council of the Association at an early date. He could not conceive a more paltry arrangement than that of the post-card forms, displaying private particulars to all eyes, provided for the purpose by the Employment Exchanges.

Mr. CHARLES ROPER (Bradford) thought that something ought to go direct from this meeting to the National Gas Council.

Mr. GARSED withdrew his former proposition, and moved that this course be taken.

It was ultimately decided, on the motion of Mr. SUTCLIFFE, seconded by Mr. GARSED, that a letter be sent to the National Gas Council asking them to take urgent steps to press for the early release from the Forces of men who were training for the gas engineering profession and auxiliary trades at the time of enlistment; pointing out that a large number of men between the ages of 18 and 25 were losing valuable experience, and should be given the opportunity of returning to the industry with the least possible delay. It was further decided that copies of the letter should be sent to the Secretary of the Joint Junior Council and to each of the Junior Associations, with a request that they should take the matter up.

ELECTION OF OFFICERS.

The result of the ballot vote for officers for 1919 was as follows:

Senior Vice-President.—Mr. J. M'Lusky (at present on service in the Royal Air Force) if he returns during the year.
Junior Vice-President.—Mr. G. Dougill.
Hon. Treasurer.—Mr. P. M'Nab.
Hon. Secretary.—Mr. W. H. Riley.
Assistant Hon. Secretary.—Mr. F. Peel.
Members of Council.—Messrs. C. Roper, F. Pykett, E. A. Leask, L. Shaw, and W. Carter.
Hon. Auditors.—Messrs. A. Lister and G. H. Walker.

* See p. 572.

MANUFACTURE OF CARBO-COAL.

The Nov. 30 issue of the "Journal of the Society of Chemical Industry" contains an abstract of a contribution by Mr. W. Savage to the Engineering and Mining Journal of New York (Vol. XIX.), dealing with the manufacture of "Carbo-coal" briquettes.

It is claimed that a satisfactory product has been obtained in the beehive oven from coals containing up to 32 p.ct. of volatile substances; while with bye-product ovens the best results are given by harder coals with 23 to 28 p.ct. of volatile substances. Coal containing more than 4 p.ct. of moisture gives inferior results. In Smith's process [U.S. Patents Nos. 1,177,727 and 1,224,424 of 1915], an intermediate soft semi-coke containing 16 to 20 p.ct. of volatile matter is made into briquettes with hard pitch under pressure, and carbonized at suitable temperatures. The product ("Carbo-coal") has been tested by several railway companies and by the U.S. Navy, and found to burn more readily than coke. With a rate of combustion of 27 lbs. per square foot of grate area per hour, it evaporated 12·8 lbs. of water per pound of fuel; and with 100-lbs. combustion rate, 8·5 lbs. of water.

In working the process, any grade of bituminous coal is reduced to about twelve-mesh size, and fed continuously through a cylindrical retort containing agitators rotating at about four revolutions per hour. The retort, which is of refractory material, is heated to about 900° Fahr. (480° C.) by the combustion of the gases evolved in the process; and after distillation for about an hour the material is cooled in a hopper, and then conveyed to crushing and pulverizing machinery. The finely divided semi-coke is incorporated with several per cent. of pitch in a mixing machine heated by direct steam; and the hot mixture is transferred to a briquetting machine of the roller type. The resulting briquettes are conveyed while hot to the carbonizing retorts. As a rule only some 4 to 5 p.ct. of volatile matter is left in the residual "Carbo-coal"—this being sufficient to allow the product to burn readily in an open fireplace. From 2000 lbs. of coal thus treated, 1440 lbs. of "Carbo-coal" briquettes are obtained, and 560 lbs. of gases and vapours, of which 200 lbs. are permanent gases used for heating the retort. The vapours consist of 20 lbs. of ammonia, and 250 lbs. of tar oils including benzol, toluol, naphthas, motor spirits, creosote oils, tar acids, pitch, &c. The tar obtained in the primary distillation of the coal has a specific gravity of 1 to 1·06. It contains no naphthalene, anthracene, or phenol, but is rich in oils, tar acids, and cresols.

The following table shows the liquid products yielded by a ton of coal, in comparison with the amounts of bye-products from the coke oven:

—	Distillation Temperature.	Bye-Product Coke Oven.		Carbo-coal, First Distillation.		Carbo-coal, Second Distillation.	
	°C.	Gallons.	P. Ct.	Gallons.	P. Ct.	Gallons.	P. Ct.
Light oil . .	Up to 77	0·27	3·47	1·58	6·60	0·003	0·05
Middle oil . .	77—110	0·44	5·85	3·29	13·70	0·036	0·60
Creosote oil .	110—132	0·78	10·37	3·11	12·95	0·126	2·10
Heavy oil . .	132—182	1·26	16·81	8·88	37·00	2·485	41·42
Pitch	..	4·66	62·18	6·90	28·75	3·290	54·83
Loss	..	0·09	1·32	0·24	1·00	0·060	1·00
		7·50	100·00	24·00	100·00	6·000	100·00

An Oven-Heat Regulator.

In a paper which he read before the Texas Gas Association, Mr. Charles K. Enos, of the National Stove Company, gave some particulars of a thermostatic heat-controlling service which his Company have marketed with satisfactory results for the past five years. The housewife having decided what the heat of the gas-oven is to be, all that is necessary is for her to turn a marked wheel, to set the regulator at the desired temperature. The wheel or dial is marked with the various heat terms that are familiar to all women, and also in figures ranging from 225° to 550°. The regulator being controlled by heat, heat is the only thing that will affect it; the quality or the pressure of the gas having nothing whatever to do with the control. This is an advantage in cities where there is a variable gas pressure; for the regulator, set at a predetermined heat, will maintain this heat regardless of any changes in the pressure. It is said to be really surprising to see how the work of an experienced cook is improved by the use of the regulator, which does away with the necessity for guessing. Domestic science teachers claim that 70 p.ct. of the housewife's time is taken up in watching and waiting for results; and with the temperature automatically controlled, this is unnecessary.

The first of a series of three Cantor Lectures at the Society of Arts, on "Physical Chemistry and its Bearing on the Chemical and Allied Industries," was delivered yesterday (Monday) week by Mr. James C. Philip, O.B.E., M.A., Ph.D., D.Sc., Professor of Physical Chemistry at the Imperial College of Science and Technology. Among other matters to be dealt with are surface combustion, synthetic ammonia, the water-gas equilibrium, oxidation of ammonia, and the *rôle* of the catalyst. The second of the lectures was given last night, and the last will be delivered next Monday.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Unalterable Air and Gas Adjustment.

SIR,—In reply to the letter, signed "A Satisfied User of Oil-Washed Gas," which appears in the "JOURNAL" of the 3rd inst., I may say that the burners with gas and air supplies fixed for pre-war gas are found to give trouble in this district when the quality of gas approaches 450 B.Th.U.

T. HARDIE.

Gas-Works, Newcastle-upon-Tyne, Dec. 4, 1918.

Gas Officials and News Reports.

SIR,—I am considerably surprised at, and take the strongest exception to, the attitude you adopt in your Editorial remarks with regard to the question of inaccurate news items.

Surely a public journal of any standing, technical or otherwise, must accept fully the responsibility for any report it chooses to publish. The correspondent who forwards such a report is presumably known to the editorial staff, and they must exercise their own judgment as to whether they can rely on the information supplied. If such a course is "recognized" by the paper, obviously an interested party can be under no responsibility for inaccuracies merely because he has not furnished information. No officer of a public undertaking is, *ipso facto*, created a correspondent for a journal, technical or otherwise. On the other hand, it is always open to the editor to have information verified if he has reason to think that, coming as it may do from an unofficial source, it may not be fully accurate; and it is a matter for his judgment to determine whether accuracy should take precedence over prompt transmission of news.

For my part, I most decidedly object to being held in any sense responsible for the inaccuracy of a report inserted without my knowledge, apart altogether from the question as to whether in a particular case I or any other official may feel that publicity is a matter that is to be desired.

PHILIP G. G. MOON, Acting General Manager.

Bournemouth Gas and Water Company, Dec. 7. 1918.

[This expression of Mr. Moon's surprise and personal views needs little comment. The existence and position of the "JOURNAL," after seventy years' service to the gas industry, is sufficient evidence as to the exercise of judgment and discretion; and we must be allowed to utilize a long experience to guide us as to the conduct of the "JOURNAL." Our news correspondents are men upon whom we do place reliance. It may be, as in this case, they are occasionally misinformed; and, when this is so, there is not always on the surface the evidence of inaccuracy. When there is, naturally we should make necessary inquiry, though it caused delay in publication. Whatever may be the opinion of our correspondent, the fact remains that week by week the "JOURNAL" post-bag contains first-hand information from many gas officials, who prefer to ensure accuracy, and who do not trust to chance in regard to matters which they desire to remain unpublished. Again we refer those officials who habitually run the risk of inaccuracy in respect of matters which they consider of importance to the paragraph published on p. 506 last week, which we are pleased to say has already been useful in respect of other news items.—ED. "G.J."]

Benzol Extraction and Ill-Timed Letters to the Public Press.

SIR,—At a largely attended meeting of the members of the Yorkshire Commercial Section, which was held in Leeds on Tuesday, Dec. 3, the following resolution was passed unanimously; and I was instructed to forward a copy of the same to the Technical Press:

That this meeting of Yorkshire gas engineers deplores the action of Mr. Carpenter in writing a letter to the public press urging the immediate discontinuance of benzol extraction, and submits that such questions (linked as they are with the major question as to what quality of gas is most suitable for general use) can only be settled by the authorities in conference with the authorized representatives of the gas industry, and believes that attempts by individual engineers to form or influence public opinion at the present stage are ill-timed and prejudicial to the best interests of the gas industry generally.

I shall be obliged if you will insert this letter in your next issue.

W. BAILLIE, Secretary.

Dec. 7, 1918.

Stripped Gas.

SIR,—What is the truth about "stripped" gas? As a practical man engaged in the gas industry, not too closely allied to matters in connection with meters (but who still has made them somewhat of a speciality and hobby), I enjoyed reading, and endorse a good deal of, the contribution in your last issue, under the above title.

But I differ from such a sweeping statement as: "No one foresaw the serious trouble due to the effects of 'dry' gas on the consumer's meter." This may have been foreseen by many. Based on long practical experience, I read in 1910 a paper, "Suggestions on the Sales of Gas Act," before the Yorkshire Junior Gas Association; and the following quotation from it can be seen in the "JOURNAL" for March 22, 1910: "The dry meter is affected by the 'dryness' of the gas abstracting oil from the diaphragms—thus allowing the gas to pass through the pores, and be consumed unregistered. The valves must also suffer in this case, as the gas has generally been relied upon to contain sufficient lubricants for them." I have seen no contradiction of this; and the recent reports of scientific investigation have thoroughly demonstrated the fact.

However, this is only one of the items arising from the altered conditions that are shortening the "internal life" of meters which will have to remedied; otherwise any extra revenue derived will in its turn be "stripped."

PETER M'NAB.

Oakenshaw Gas-Works, Bradford, Dec. 5, 1918.

The Coal Controller's Priority Instructions.

SIR,—Would it be improper to inquire what Mr. Thomas Glover is doing? It was understood that he was appointed to advise the Coal Controller as to the requirements of gas-works; and it was felt that the interests of gas undertakings would thereby receive proper attention.

In a circular-letter dated Nov. 20, issued from the Coal Mines Department, Board of Trade, the following instructions are given to collieries and merchants:

> In order that there may be no failure to comply with the purpose and intent of these instructions, it has been decided that the following shall be the order of priority in which coal requirements shall be met:
>
> Admiralty; also shipment to Allies and British Possessions.
> War Office requirements.
> Railways.
> Bunkers.
> Shipments to Neutrals.
> Household supplies and agricultural requirements.
> Gas and electricity works.
>
> Until the above requirements are completed, coal which can be applied to meet the above requirements may not be supplied for any other purpose.

It will be seen that gas and electricity undertakings are placed at the bottom of the list, which apparently means that, when all these other requirements have been met, the balance (if any) may be supplied for gas and electricity.

I trust it is not even now too late for Mr. Glover to make representations on our behalf.

A SUFFERER.

Dec. 6, 1918.

[The above matter was referred to in our Editorial columns last week, p. 506; and it is again alluded to in to-day's number, p. 562. —ED. "G.J."]

The Home Supply of Benzol.

SIR,—I am in complete agreement with Mr. Wynter Blyth's view as to the importance of fixing a standard for motor benzol.

Hitherto, this has not been sufficiently realized by producers; and consistent development has been retarded, with loss to the industry, for, despite the higher thermal value volumetrically, in contrast with petrol, the quotation for benzol has never appreciated to the level of petroleum spirit.

One of the reasons (perhaps the principal) is the lack of uniformity. A specification preferably drawn on the lines of that applicable to 90 p.ct. as used in the colour industries, with such modifications as experience has suggested, should be adopted; and consumers are entitled to evidence that the benzol they purchase does conform to the standard so fixed, when they will be agreeable to pay a fair valuation.

While I am in sympathy with the proposal to appoint a Committee comprising the several interests, I would suggest that Mr. Blyth shall publish the specification he advises. Probably others, both makers and consumers, will indicate their views, from which a basis of agreement may be reached. The Motor Press are, I believe, entirely sympathetic, and will lend their aid to promote the achievement of standard conditions.

I am not in agreement with the proposal to establish three grades. This would tend to complicate matters.

I may state that we are quite willing to contract for the output of any plant subject to the adherence of makers to the specification we fix, which evidently complies with the requirements of motorists, judging by the certificates we have obtained for our makes.

D. BAGLEY.

92, Victoria Street, S.W., Dec. 4, 1918.

Trouble with Gas Workers at Coatbridge.

SIR,—Our attention has been drawn to a paragraph under the above heading in your issue of yesterday. As the statements contained therein are quite contrary to the facts, we shall be glad to learn from what source the information was obtained.

We may state that the Company had no opportunity of granting a holiday or making a money allowance. When application was made by the workmen, they were informed that the matter would have the attention of the Directors at their first meeting. Without comment, the men intimated on Thursday afternoon, Nov. 28, that they would cease work for two days' holiday, commencing at 6 o'clock on Friday morning, which they did.

For the COATBRIDGE GAS COMPANY,
GEO. BRAIDWOOD, Engineer and Manager.

Coatbridge, Dec. 4, 1918.

[The news item referred to was received from one of our regular local correspondents.—ED.—"G.J."]

Gas-Furnace Temperatures.

SIR,—Our attention has been called to the letter of the Davis Furnace Company, published in your columns of Nov. 26, referring to the description of our electric tool-hardening furnace. The Editor of "Electrical Industries" did not, we feel sure, intend to infer that the best type of gas-furnaces could not be run to a temperature over 1200° C.; and we quite accept the statement that temperatures up to 1500° C. can be reached. We think you will agree, however, that this can only be done with some difficulty; whereas, with our electric furnace, these degrees of heat can be reached in a few minutes, with the utmost facility.

We note that your correspondents complain that in the test quoted in the column of "Electrical Industries," no voltage was stated; so that the power consumed could not be checked. We have forwarded the fullest information to the Editor of that paper, and can state that the voltage was 100, and the periodicity, 50.

The following further record, taken from the regular work done with one of these furnaces, may interest you:

MILLING CUTTERS.

Exterior Dia. MM.	Bore. MM.	Width. MM.	Weight. Gr.	—	Reached °C.	Within Seconds.
120	32	25	1355	Without being warmed-up direct to 1300°.	1300°	128
120	32	25	1355	Previously warmed-up to dull red in usual way, in charcoal fire.	1300°	62
115	32	20	951	Ditto	1300°	Aver. 50
38	17	45	250	Ditto	1300°	Aver. 21

BUSH OF ORDINARY TOOL STEEL, with Flange of 15 mm. by 98 mm.

70	30	70	2550	Without previously warming-up.	850°	4 m. 3 sec.

ONE-INCH SCREW CUTTER.

—	—	—	760	Warmed-up	850°	150

On the basis of these and similar figures, we maintain that where a large quantity of tool-hardening has to be handled, the saving effected by the use of this furnace in highly-paid labour alone is a deciding factor.

MARRYAT AND PLACE.

28, *Hatton Garden, E.C., Dec.* 2, 1918.

REGISTER OF PATENTS.

Gas-Producers.—No. 119,207.

LYMN, A. H., and RAMBUSH, N. E., of Westminster Palace Gardens, S.W.

No. 8258; May 17, 1918.

The inventors point out that in patent No. 15,467 of 1915 a number of revolving grates for gas-producers, adapted to mechanically raise or lower the producer charge, are described, their disadvantages explained, and a claim was made for a revolvable ash bowl and grate with regular or irregular surfaces for raising and laterally displacing the fuel, "with the object of mildly agitating the lower part of the producer charge in a vertical as well as in a more or less horizontal direction." The whole or part of the superficial area of the revolving grate adjacent to the producer charge was made of incomplete spiral, screw-propeller, whorl, or similar configuration, the surfaces of which have a very gradual rise, terminated by abrupt shoulders of considerable depth. But it has been found, with certain classes of fuel, that abrupt shoulders of considerable depth cause the charge to drop too abruptly and suddenly, which, with certain kinds of fuel, leads to irregular working.

The present invention aims at obviating this disadvantage by providing means by which, while a considerable total drop of the charge is retained, the drop of the charge is rendered less sudden and abrupt. It also provides for constructional improvements, with the object of reducing the cost of manufacture.

Gas-Heating Stoves.—No. 119,397.

DAVIS, J. E., of Ironton, Ohio, U.S.A.

No. 4341; March 12, 1918.

The primary object of this invention is to produce a heating stove, in which the flame is broken up and retarded, "which causes it to incur a secondary mixture with the air and produce a perfect combustion," by providing a fire-resisting clay back for open-front gas-stoves embodying in its construction a roughened surface so fashioned as to induce the flame to cling to the fire back throughout its entire surface.

This is effected by embodying in the fire-clay back a plurality of staggered projections extending outwardly at right angles from the face—some of the projections comprising solid heat-absorbing units, and other projections hollow heat absorbing units; the solid ones being located on the lower surface of the fire-clay back and the hollow ones above. The solid projections are triangular in shape, and the hollow units of **V**-shape. The apex of each of the former having its angles disposed downwardly, while each **V**-shaped unit has its apex disposed downwardly.

Steaming Retort Charges.

No. 120,458.

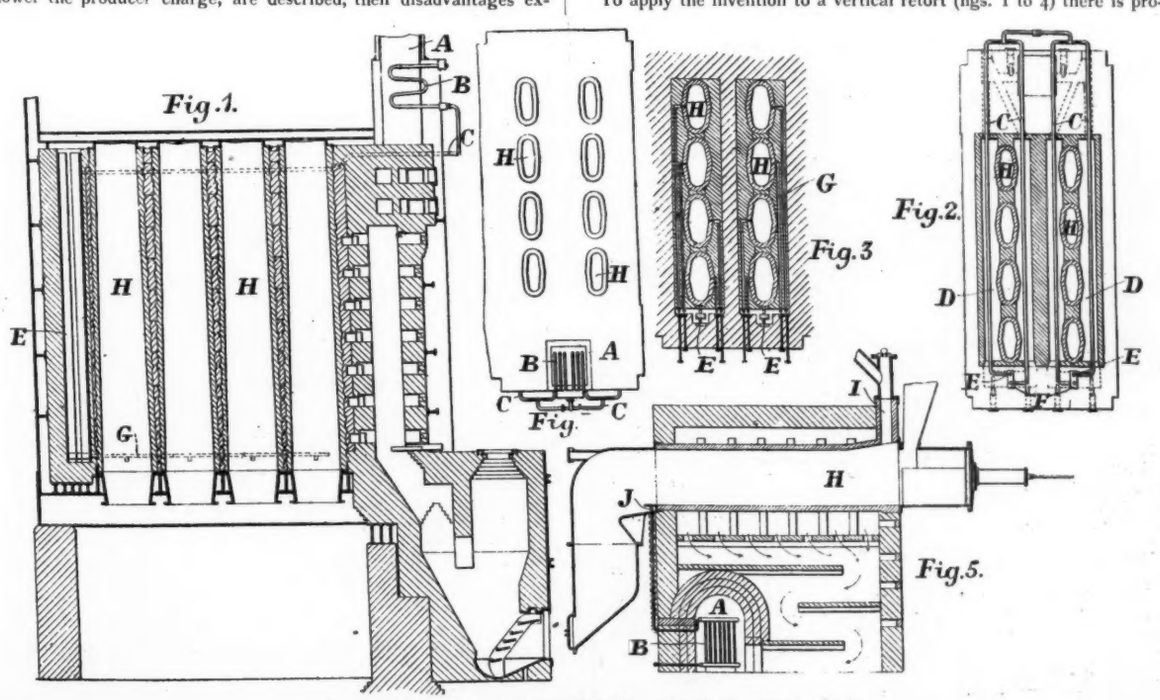
GLOVER, S., of St. Helens, WEST, J., of Southport, and WILD, W., of Blackpool.

No. 17,013, Nov. 20, 1917. No. 7586; May 6, 1918.

This joint invention (relating to vertical, horizontal, and inclined retorts for the continuous carbonization of coal and like carbonaceous materials) has for its object "to provide for the obtaining, with great economy of fuel, of high gas yields and also high tar yields, per ton of coal carbonized." It has been proposed, the patentees point out, to accomplish this object by injecting superheated steam into the incandescent coke in the retorts; and their invention comprises the improved arrangements of the superheater and the superheated steam supply pipes and connections.

Fig. 1 is a sectional elevation of the retort-setting. Fig. 2 is a sectional plan on the line of the steam-pipes passing through the chambers at the top of the retorts. Fig. 3 is a sectional plan on the line of the steam-ducts supplying steam to the lower ends of the retorts. Fig. 4 is a plan of a portion of the retort-setting. Fig. 5 shows the application of the invention to a continuously operating horizontal retort.

To apply the invention to a vertical retort (figs. 1 to 4) there is pro-



Glover, West, and Wild's Arrangement for Steaming Retort Charges.

vided at the base of the chimney A a superheater B, which may consist of a nest of tubes or of a coiled tube, through which steam is passed under pressure The steam then travels in the pipes C through the waste-gas circulating chambers D at the top of the setting and through ducts E in the division wall F in the vertical passage or duct by which the products of combustion from the combustion chambers of the retort-bed rise on their way to the chambers D and the chimney. The steam is thus highly superheated, and is then passed by the ducts G to the various retorts H, and caused to issue into the incandescent coke in them.

The patentees remark: The highly-superheated steam issuing through the incandescent coke is converted into blue water gas without the extraction of a large quantity of heat from the contents of the retort; so that increased efficiency is obtained. The water gas passes into and through the central core or mass of partially carbonized and uncarbonized coal in the retorts, and effects or expedites its carbonization, carrying off with it the volatile hydrocarbons before they have been subjected to destructive distillation at very high temperatures.

When applying the invention to continuously operating horizontal or inclined retorts, as described in patent No. 113,981, it is arranged (as shown in fig. 5) for the gas to be withdrawn from the retorts at or towards the charging end by way of the pipe I, and for the superheated steam to be admitted at J beneath the hot coke falling from the retort, so that the steam always issues into the coke. The retorts H are so proportioned that the coke practically fills them, and so ensures that the steam must pass through the incandescent mass.

Regenerators for Coke-Ovens or Analogous Devices.—No. 120,079.

BAGLEY, D., of Victoria Street, Westminster.

No. 15,346; Oct. 22, 1917.

The patentee points out that in the usual construction of coke and other ovens two regenerators are placed end-to-end beneath each oven, to serve the heating flues corresponding with that oven. One regenerator heats the air supplied to the flues above it; while the other is being heated by the products of combustion from the flues above it —these functions being periodically reversed.

Such regenerators are, he contends, not as efficient as they might be, because the draught causes the gases to take an obligue course in them—thus using to the fullest extent only a portion of the brickwork —a difficulty that has been met by sub-dividing the regenerator into compartments by vertical partitions, causing the gases to travel in vertical paths to the collecting flue beneath the regenerator. Here again, however, there is a tendency for the gases to travel through the compartments at different velocities, varying inversely with the distance of the compartment from the exit of the collecting flue.

To avoid this, he proposes that the cross-section of the passage from each compartment to the collecting flue is increased as the distance of the compartment from the exit increases. What happens in the case of the descending streams of products of combustion happens also in the case of the ascending air; and by his present invention provision is made for distributing the air more or less uniformly over the whole of the compartments by constructing beneath the regenerator an air supply channel the cross section of which diminishes uniformly from the end at which the air enters to the other end.

Such a construction, as applied to an oven having a waste-gas collecting flue beneath the air-flue, is illustrated and described—a construction that lends itself to the preheating of the air supply by means of the end compartment of the regenerator.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Dec. 4.]

Nos. 19,338--19,842.

AIRD, K.—"Gas-burners." No. 19,548.
BANKS, W.—"Gas-fires." No. 19.657.
BERESFORD, D.—"Marine reversing gas-engine." No. 19,538.
CHALMERS, R. B.—See Aird. No. 19,548.
COLSON, L.—"Apparatus for synthetic production of gas from coal." No. 19,378.
ETNA LIGHTING AND HEATING COMPANY.—"Incandescent gas-burners." No. 19,438.
FLETCHER, RUSSELL, & Co.—See Banks. No. 19,657.
FLETCHER, RUSSELL, & Co.—"Trays." No. 19,658.
HELPS, G.—"Gas-stoves, burners, &c." No. 19,424.
HELPS, G.—"Atmospheric gas-burners." No. 19,503.
HODGSON, J. L.—"Gas-measuring apparatus." No. 19,339.
IONIDES, A. C.—"Heating gaseous fluids." No. 19,827.
KENNARD, J. H.—"Apparatus for heating water by application of intensive gas heat." No. 19,636.
KIRBY, A.—"Burners for liquid fuel." No. 19,464.
KIRKE, P. ST. G.—"Gas-fired steam-generators and apparatus for heating liquids." No. 19,754.
MARKS, E. C. R.—"Treatment of gases producing distillation coking, or gasifying coal, &c." No. 19,677.
PROSSER, H. R.—See Etna. No. 19,438.
RITSON, H. L.—"Retort discharger for gas-works, &c." No. 19,516.
RUDGE-WHITWORTH, LTD.—"Means of ascertaining composition, nature, and effect of gases and vapours." No. 19,796.
SMITH, D. J.—"Gas-producers." No. 19,697.
Soc. Franco-Belge de Fours à Coke.—See Marks. No. 19,677.
SOUTH METROPOLITAN GAS COMPANY.—See Kirby. No. 19,464.
WEBB, J. W.—"Injectors for compressing air, &c., gas." No. 19,487.

Sale of Stocks and Shares.

The last sale of gas and water stocks and shares which Messrs. A. & W. Richards will hold at the Auction Mart [the premises having now been acquired by the Bank of England] took place on the 3rd inst., and was very successful. It was, indeed, distinctly encouraging to note the keen competition in connection with the principal gas item in the catalogue—namely, £1000 of ordinary stock of the Plymouth and Stonehouse Gas Company, ranking for a standard dividend of 5 p.ct., subject to the sliding-scale. The pre-war rate of dividend on this stock was £6 2s. 6d. p.ct.; the rate payable for the half year ended Sept. 30 last, £4 2s. 6d.; and the present authorized dividend, £4 10s. The stock sold at 83 and 83½ per £100, giving a present yield of 5½ p.ct.; buyers evidently considering—no doubt, rightly—that there are excellent prospects of a higher dividend and increase in capital value as war difficulties begin to pass away. In the Barnet District Gas and Water Company, £500 of "D" capital water stock, ranking for a maximum dividend of 7 p.ct., and receiving £6 6s. p.ct., realized 112½ per £100. Some 4 p.ct. perpetual debenture stock in the Southend Water-Works Company sold at 70; and 200 £10 5 p.ct. preference shares in the South-West Suburban Water Company, at £9 2s. 6d. each.

Municipal Loan Restrictions Relaxed.

An official statement has been issued to the effect that, owing to the cessation of hostilities, some reduction in the national expenditure may be anticipated; and, though the requirements of the State must necessarily continue to be large for some time to come, the Government are anxious to begin as soon as possible to relax the restrictions upon capital issues in so far as such issues are urgently necessary for the establishment of local services, trade, and industry upon a peace basis. While such relaxation must, of course, in the earlier stages, be of a gradual and tentative character—regard being paid to the comparative urgency of the various purposes for which issues are required—the Local Government Board or other appropriate Department are now, in conjunction with the Treasury, prepared to consider applications from local authorities for permission to raise loans in order to enable them to put into operation schemes of public utility—such as housing, water supply, sewerage, hospitals, gas, and electricity, and maintenance and construction of roads, which are of urgent importance. In view of the impossibility of providing any large sum for advances from the Local Loans Fund while direct borrowing for the National Exchequer continues, it will not be possible at present to consider applications for loans from this fund, except in the case of smaller authorities for very urgent services, and then only to very limited total amount; and with this exception, it is essential that the necessary loans should be raised locally by the authorities concerned.

Better Coal Supplies at Barrow.—At the Barrow Town Council meeting on Monday of last week, Mr. Brown (the Vice-Chairman of the Gas and Water Committee), answering a question about the quality of gas, said that coal supplies were now coming in better than formerly.

Fuel and Lighting Order Prosecutions.—An Order entitled the Household Fuel Prosecutions Order, 1918, has been made by the Board of Trade, in which provision is made for prosecutions under the Household Fuel and Lighting Order. A Local Fuel Overseer may institute and carry on proceedings in connection with any offence committed within his district, provided that consent to such prosecution has been given in writing (*a*) by the Local Fuel and Lighting Committee, if any, for the district, (*b*) by or on behalf of the Controller of Coal Mines.

Gas Supply of Goole.—Mention was made in last week's issue of the "JOURNAL" that there had been some discussion by the Goole Gas Committee with regard to the inadequate lighting of the town; and it is gratifying to learn from the Engineer and Manager (Mr. L. W. Nuttall) that the only inadequate lighting there is any complaint about is with reference to the public lamps. There are at present less than a hundred lamps lit; and the Committee are prepared to light more than twice this number, if only they can secure the necessary labour. During the whole period of the war, he says, there has never been a short supply of gas, nor have they had occasion to reduce the pressure.

Wages Board Proposed at Bradford.—The Bradford Corporation War Wages Committee propose the establishment of a Standing Joint Consultative Board of the Corporation and their employees in matters of wages and working conditions, and to take action to prevent differences and misunderstandings between the Corporation and the employees. Among other objects, the Board will discuss the best means of securing the greatest possible security and continuity of employment, and "the consideration of measures for securing the inclusion of all workpeople in the service in their appropriate trade unions or associations." The proposed Board will comprise 32 members, representing the two sides equally.

A Shop Lighting Concession.—Addressing a deputation at Ashton-under-Lyne early last week, Sir Albert Stanley said that arrangements had been made for shopkeepers to have as much light in their windows as they considered necessary, within their ration limits. This was to happen almost immediately; and no time limit was specified. Strict economy in coal was still necessary. Passenger trains were being rushed between England and France, to bring back miners from the front as quickly as possible; but the restrictive regulations as to coal could not be relaxed yet. It has since been announced by the Board of Trade that they have suspended the operation throughout England and Wales of Part IV. of the Lighting, Heating, and Power Order, 1918 (which prohibits shop-window lighting), from yesterday, through the holiday period. Due notice will be given on the re-imposition of the restrictions; and a further announcement will be made at an early date as to the Scottish seasonal holiday. No additional gas or electricity can, however, be granted for this purpose. The Advertisement Lights Orders remain in force.

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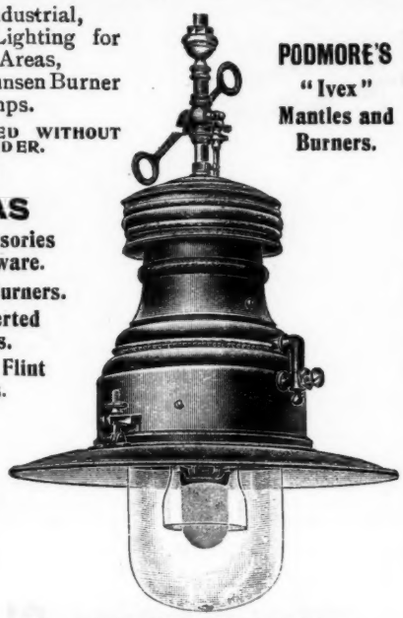

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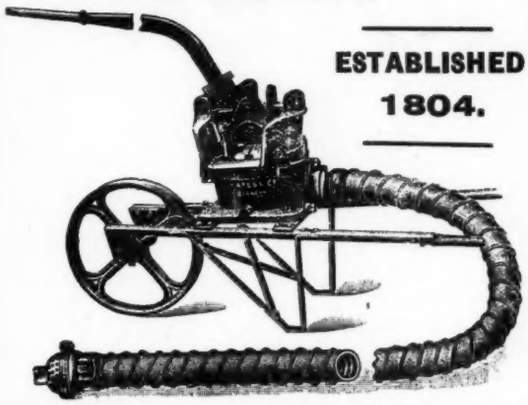

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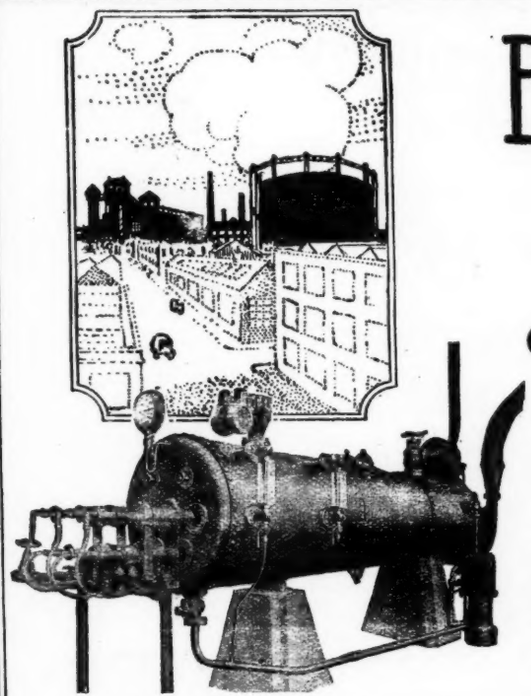

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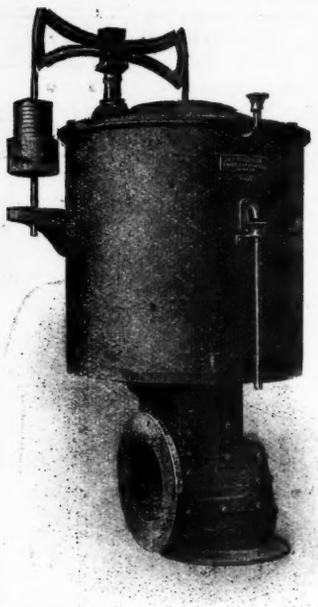

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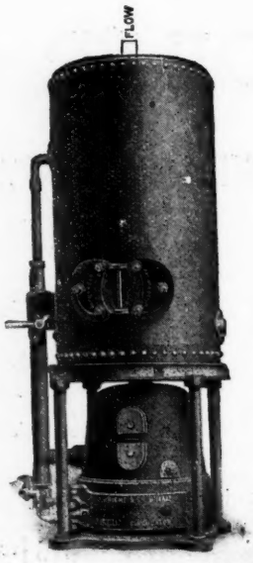

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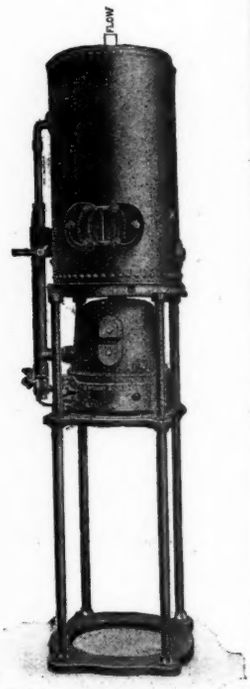

The "B.T.U." Builders' Set on High Stand.

MISCELLANEOUS NEWS.

CO-PARTNERSHIP IN THE GAS INDUSTRY.

The South Metropolitan Company's Scheme.

A series of five conferences is being held, in Kingsway Hall, W.C., under the auspices of the Labour Co-Partnership Association, to discuss certain experiments in profit-sharing and co-partnership; on each occasion a particular scheme being explained by someone intimately connected with it, and able to point out its success and possibilities. Last Wednesday afternoon, at the fourth of the meetings, it was Mr. Charles Carpenter, D.Sc., who was introduced by the Chairman (Mr. E. O. Greening) to give an account of co-partnership as it is practiced in the South Metropolitan Gas Company. What he had to tell was a good story; and though he said it was so simple that he had all along had grave doubts as to whether it was worth while making its telling a public matter, his remarks were listened to with close attention, and were followed by questions and expressions of opinion which indicated much interest in the subject.

The most that he could claim for the story, Mr. Carpenter said, was that it was a true one; and he could only hope that it would not be found to be less attractive because its episodes were facts. From the story-teller's point of view, it also suffered by not being a war tale, but one dealing with peace—industrial peace extending over 28 years. The Company with which he was dealing is one of the three or four whose business it is to supply the Metropolis with one of the necessities of its existence; and for this reason he must take up a few minutes in explaining something of its working, in case when he had finished he might be told that his story had no moral application to the ordinary affairs of life. Little more than a century had elapsed since the possibilities of gas supply were realized by a group of persons, who obtained a Charter to manufacture and distribute coal gas; and the same undertaking exists and flourishes to-day. Like his own Company, too, it is a co-partnership concern. After years of patient working, that Company established its claim to be considered seriously, with the consequence that other companies sprang up all over London for supplying gas. In 1847, a limit of profit-making to 10 p.ct. was placed upon these undertakings, just as in the case of water-works and railways. At that time, these industries were opening up all over the country; and Parliament, realizing the important part they would play in the future development of the land, set to work to lay down certain regulations and restrictions under which gas concerns had to work; and among other things this 10 p.ct. was decided upon. One of the disadvantages of the method of working then in vogue was that in many districts there were two or three undertakings all at work doing the same thing. This would not have mattered so much if they had confined their operations to building factories; but these factories would have been useless without a system of mains for supplying the gas. There was free competition between the undertakings; and the public suffered from two or three of them being continually at work tearing-up the streets. However, in 1860 Parliament gave to each undertaking a prescribed area within which to lay its mains. This monopoly of laying mains is the only one which a gas company has to-day; and it has enabled gas to be supplied much more cheaply than would otherwise have been possible, because it has obviated the necessity of having several sets of mains instead of one.

In 1876, Parliament declared that no new capital should be raised except by public auction or tender; and also that any premium obtained in this way should be applied to capital purposes, but without bearing any interest. This at once gave the consumers of a company the opportunity of becoming shareholders. Simultaneously was fixed a standard quality and a standard price for gas, and also a variable dividend, which rose or fell as alterations were made in the price. By this step, consumers were brought in with the shareholders; both securing an interest in economical working. The foremost figure in the matter was the late George Thomas Livesey; and he proposed, in 1876, though unsuccessfully, that this community of interest should be extended to the employees of the Company in which he was interested. At that time, the Board of Directors were not so progressive as some Directors are to-day; and they turned the proposition down as being absolutely unsuitable.

The next interesting date, proceeded Mr. Carpenter, was 1889—the year when the dockers struck for their "tanner an hour." In that same spring was founded the Gas Workers' Union, with the main objective of an eight-hour day in the retort-house. It had been worked in many parts of the country, but was not the practice in London. The eight-hour day instead of the twelve-hour day was conceded without any difficulty. As a matter of fact, George Livesey himself had pointed out some years before that there would be advantages in it; but, like Boards of Directors, men at that time were not very progressive, and some said they would rather work longer hours and earn the big shilling. The eight-hour day having been so easily secured, one would have thought the Union would have been contented to rest on its laurels; for the concession was a large one, because the remuneration was the same as was customary for a twelve-hour day. But the contrary proved to be the case; and there resulted a policy of continual pin-pricking. The concessions made were not in themselves serious; the most serious thing was the spirit of hostility shown. Mr. (later Sir) George Livesey realized that it was impossible to carry on, with full regard to the interests of the Company, an undertaking so hopelessly divided internally; and he considered the moment was opportune to launch the scheme on which he had already set his heart, of extending to every worker a chance of sharing profits, in addition to receiving his standard wages. This proposal was made in the autumn of 1889; but the gas stokers would have nothing to do with it, and Mr. Livesey reluctantly withdrew the scheme. Another section—mechanics and artizans—thought it might be a good thing; and in the end Mr. Livesey agreed that to those who wanted the scheme it should be available, and the others could leave it alone.

The essence of the scheme was that masters and men should enter into a sort of partnership of employment and service. The proposal was taken up with great eagerness by the men in the repairing and distributing departments; and three men of the stoking section followed suit. The Union then thought that the time had arrived for a trial of strength; and they gave notice that unless the scheme was withdrawn and the three men dismissed, they would come out on strike. This they did, because the Company were too deeply committed to the principle to withdraw it. Other men took their places; and the supply of gas did not cease. At that time the custom of the trade was invariably a week's notice on either side; and the Union leader said a mistake had been made in adhering to it. "Next time," he said, "we will down tools." It was thereupon decided not to employ men belonging to this Union; but that rule has long since disappeared. Their profit-sharing scheme (since developed into co-partnership) was therefore born in trouble.

As to the basic principle of co-partnership, the argument is that capital is entitled to fair interest on its investment. This amount must depend upon circumstances. In their own case it was fixed at a figure decidedly too low to meet present conditions—namely, 4 p.ct. All profits the undertaking makes beyond this rate are shared between the consumer, the shareholder, and the employee. The standard rate for gas is 3s. 1d. per 1000 c.ft.; and the wages are the customary district rates. When the amount received is in excess of what is required to meet these three outgoings, the profit begins to accumulate, and is disposed of by reducing the price of gas. For each 1d. reduction, 2s. 8d. p.ct. additional is paid to the shareholders, and ¾ p.ct. to the workers above the standard wages. All three parties, therefore, are interested in the well-being and prosperity of the undertaking. During the 28 years the scheme has been working, the Company have on occasions brought down the price of gas to 1s. 1d. below the basic figure, paying an increased dividend of some 1½ p.ct., and allocating 9¾ p.ct. above standard wages to the employees. These yields—he was speaking, of course, of pre-war times—had given general satisfaction. Now, things are different. The price of gas has gone up to 1s. 3d. above standard, the dividend has fallen to practically one-half its pre-war figure, and the workers' bonus has dropped to zero. So the scheme has been tested under the most extreme conditions. All the necessities of life were getting dearer and more difficult to obtain; and under these conditions the co-partnership had to meet its greatest trial. He could not say that any one of the three partners in the undertaking is contented; but they are satisfied that the war burden is being fairly allocated, and look forward to better times. It must be borne in mind, too, that unlike industry generally, the standard rates of their employees have only been increased to keep pace with the cost of living; and they have not been receiving the very high rates of remuneration paid to those engaged in the manufacture of iron and steel, ships, munitions, and practically the whole of the work with which for over four years the country has been occupied. The output of these other things had, of course, to go on at increased rates to win the war; but the public services have been cut down to one-half as an emergency measure.

Setting himself to answer the question, "Does the employee justify his admission to co-partnership?" Mr. Carpenter explained the working of the Co-Partnership Committee and its constitution, as well as the arrangement for having Employee Directors on the Board. He said he thought the workman was able to influence to the greatest extent the prosperity of the undertaking by his work on the Co-Partnership Committee, rather than by work at the Board table, though he fully agrees with the usefulness of both. In the case of his Company, the Co-Partnership Committee is now made up of 82 representatives. This is not the normal figure; but owing to the war female labour has been largely introduced, and representatives had to be provided for these women. Though a great number of men were with the forces, it was felt that they could not take away their representation; so the size of the Committee was increased. The Committee is really a small-scale Parliament of Labour, with businesslike habits. As to the Employee Director scheme, this was inaugurated twenty years ago; and since that time eight employees of the Company have taken part in the deliberations of the Board. They have been indistinguishable from the other members.

Proceeding, Mr. Carpenter quoted facts to show that co-partnership has been justified from the employees' point of view; and, as indicating that the employees really attach importance to the system, he said the Company have had altogether over a thousand letters from co-partners with the forces since the war began, and most of the writers refer in one way or another to co-partnership.

In conclusion, he declared that the greatest value of co-partnership is that it makes men—and they might, from the experience of the last four years, add women, too—better citizens of the commonwealth. He showed this by quoting the very large sums that have been subscribed by them to assist those who have suffered by the war. He also referred to their loyalty in accepting the principle of dilution of labour. Throughout the whole of the years of war, the Company have not had one single strike. The only approach to one was when twelve men employed in one particular branch gave proper notice, and left in an orderly manner, rather than countenance the employment of wounded soldiers on the work of meter repairing. "I have shown," he added, "by absolute facts that co-partnership is a living and active force. Surely, it can be utilized for the up-raising of the majority of the workers throughout the land, as it is already in the case of what I fear you will regard as a very small minority."

Gas-Works and Munitions.—A letter has been received by the Bolton Gas Committee, from the Ministry of Munitions, expressing appreciation of the assistance rendered in the supply of munitions during the war, and requesting that the organization of the department be utilized in order to assist in the reversion from war to peace industries at the earliest possible moment. Another letter was from the Controller of Explosives Supply for, and on behalf of, the Minister of Munitions, giving two calendar months' notice to determine the contract made between the Minister of Munitions and the Corporation for the supply of concentrated ammonia liquor, and notice requiring the manufacture and delivery of sulphate of ammonia instead of concentrated liquor until the determination of such contract.

GROWTH OF THE GLASGOW GAS UNDERTAKING.

Centenary of the Public Supply.

Reference has already been made to a carefully compiled and well illustrated pamphlet prepared by the City of Glasgow Gas Department, to mark the centenary of the public gas supply.

The names are given of those responsible for the administration of the two Gas Companies which were taken over by the Corporation in 1869; and then there are the following photographs: Mr. J. Watson Stewart (the Lord Provost), Bailie Drummond (Convener of the Gas Committee), Councillor Thomas Young (Sub-Convener of the Gas Committee), Councillor P. G. Stewart (Convener of the Sub-Committee on Finance), Councillor James Young (Convener of the Sub-Committee on Accounts), Councillor Somerville (Convener of the Sub-Committee on Gas Sales and Distribution), Sir John Lindsay, J.P., D.L. (Town Clerk), Mr. David Stenhouse, J.P. (the Senior Town Clerk Depute), Mr. Alexander Wilson, M.Inst.C.E. (Engineer and General Manager), Mr. Ralph Halkett (Assistant General Manager), Mr. A. Smith, M.Inst.C.E. (Manager of the Tradeston Works), Mr. A. Macleod (Manager of the Dawsholm Works), Mr. J. Webster (Manager of the Provan Works), and Mr. J. Frazer (Manager of the Dalmarnock Works). Some historical remarks are succeeded by a brief description of the various stations, with illustrations of the plant; and then come figures showing the remarkable growth of the undertaking.

The erection of the first gas-works in the city was commenced about 1817. It was known as the Townhead Gas-Works; and gas making was commenced about the beginning of September, 1818. There was only one bench of 25 cast-iron retorts, with a daily capacity of about 35,000 c.ft., and one holder of 25,000 c.ft. capacity—then the largest in the kingdom. A second retort-bench of the same size was under construction, also three additional holders. The other works at Partick and Tradeston were afterwards built; the latter being the only one still existing. These three belonged to the Glasgow Gas Light Company. The Dalmarnock Gas-Works were built by the City and Suburban Gas Company of Glasgow, and are still in operation. The Corporation in 1869 found the then existing works inadequate for the demands of the district, and proceeded to acquire land at Maryhill and construct new works, now known as Dawsholm, and appointed the late Mr. William Foulis their Engineer. In addition to his many other duties, Mr. Foulis designed the Dawsholm works, re-constructed those at Tradeston and Dalmarnock, and designed the Provan works, near Blackhill. But he died in June, 1903, a little more than a year before the latter were opened.

TRADESTON GAS-WORKS.

The Tradeston works (formerly the property of the Glasgow Gas Light Company) were built between 1835 and 1839, at a cost of over £20,000. In 1869 their manufacturing capacity was 1½ million c.ft., raised to 2½ millions in 1874; and in 1888 it had been further increased to 4½ million c.ft. per day. The demands of the district increased so rapidly that it was determined to reconstruct the works. It was necessary, in order to carry out the scheme, to acquire additional ground, and form under-road and over-line bridges for railways, pipes, and foot passengers. This reconstruction was begun in 1888; and the present capacity is about 9 million c.ft. per day. There are four retort-houses in one block, containing eight benches with settings of both eight and twelve horizontal retorts in the ovens, all heated on the regenerative system. The total number of retorts is 1232. There are three holders of a combined capacity of 6,900,000 c.ft., and two stores capable of holding 26,000 tons of coal. The area of the above works is approximately 16 acres.

DALMARNOCK GAS-WORKS.

The Dalmarnock works (formerly the property of the City and Suburban Gas Company) were commenced in 1843. In 1869, clay retorts of a larger size and improved construction were substituted for iron retorts formerly in use there; and the result was an improvement in the quality and an increase in the quantity of gas produced. In 1874, the manufacturing capacity was 5 million c.ft. per day. In 1876, when renewing the retort-benches, seven retorts were set in an oven, instead of five as heretofore. This system, though common in England, had hitherto been untried in Scotland; the opinion being that the coke from Scotch cannel would not heat more than five retorts in one oven. The change proved highly successful, and increased the productive capacity of the works. In 1883, as the result of experiments, the regenerative system of heating the retorts was adopted, resulting in a great saving of fuel, and increasing the producing capacity, making it 7 million c.ft. per day, at which it remained until the works were closed in 1904. In 1911, owing to the ever-increasing demand for gas having outstripped the capacity of all the works at that date, it was decided to re-construct the carbonizing plant and replace the old horizontal retort-settings by an installation of vertical retorts, similar to those already successfully in use at Dawsholm.

Owing to the fact that the works were divided, and that the coals had to be delivered on the south side while the carbonizing plant was erected on the north side, it was found necessary to adopt a transporter system to bring the broken coal across the street to the coal-hoppers over the retorts. The coal, received from the pits in railway-wagons, is emptied by hydraulic tippers on to a conveyor, placed under the rail-level, which brings the coal to a breaker, where it is reduced to a suitable size, and afterwards raised by an elevator to a service hopper, from which it is automatically measured and filled into the buckets of the transporters. The bucket, holding about 3½ tons, is raised 60 ft., and transported on a monorail and discharged into the coal-hoppers. The same transporter deals with the coke in a similar manner, depositing it into the riddling-machine over the large ferro-concrete bunkers, or into hoppers over the producers, or into stock-heaps in the yard. The coke, riddled or unriddled, breeze riddled or fine, can be loaded by gravity into sacks, carts, or railway-wagons as required. The whole of this plant is operated by electric power. The manufacturing capacity is now 5 millions; and it will eventually be increased to 10 million c.ft. per day.

DAWSHOLM AND TEMPLE GAS-WORKS.

Soon after the Corporation acquired the works of the two Gas Companies, ground was bought in the neighbourhood of Maryhill; and in 1871 the Dawsholm works were commenced. The first portion had a manufacturing capacity of 3 million c.ft. per day. In 1883 this was increased to 8 millions. In 1891 the adjoining works belonging to the Partick, Hillhead, and Maryhill Gas Company, Ltd., were acquired by the Corporation, and re-named the Temple works. They were afterwards connected with the Dawsholm works by a tunnel constructed under the Forth and Clyde Canal for railway communication and for gas-mains. In 1892 and 1896 additional retort-houses containing horizontal retorts with the necessary plant were erected, increasing the total capacity of the works to 17 million c.ft. per day. In 1911 part of the horizontal retort-settings in the original retort-house, being in need of heavy repairs, was taken down and replaced by an installation of six benches of vertical retorts—144 retorts in all—designed and patented by Mr. Alex. Wilson, the present Engineer and General Manager. These have more than doubled the productive capacity of the area occupied by the horizontal retorts displaced.

In order to deal with greater facility with the coke produced, a transporter crane having a jib 200 ft. long was erected last year, and is capable of storing the coke anywhere over an area 200 ft. in diameter to a depth of 50 ft. It can also remove the coke from any portion of this area, and deposit it in a riddling-machine or into railway-wagons. The plant is electrically driven. In 1891, the holder capacity at Dawsholm being inadequate, a large three-lift holder was erected at the Temple works to contain fully 5½ million c.ft.; and again in 1900 a second holder of similar design, with 4½ million c.ft. capacity, was erected. The total storage capacity is now 16,130,000 c.ft. An oil-gas plant formerly erected at the Temple works has been replaced by a new carburetted water-gas plant of 2½ million c.ft. daily capacity.

PROVAN GAS-WORKS.

The Provan works are the most recently constructed of the Corporation gas-works. Their design and lay-out are a monument to the engineering ability of the late Mr. William Foulis, who, as already stated, died while the works were in course of erection. The works were completed by the present Engineer.

Situated on the lands of Easter Blochairn, near Blackhill, approached by a new road 60 ft. wide and fully half-a-mile long, and convenient to both railway and canal communications, these works cover an area of 123 acres. The levels are somewhat irregular, but have been utilized to great advantage in facilitating the transference and handling of materials, as the coals, &c., are brought in on the high level and the coke despatched at the low level. The works are designed in four sections, each capable of producing 12 million c.ft.; but only one has been completed.

The coal-stores have a capacity of 50,000 tons, and are adjacent to the retort-houses. The railway-wagons containing the coal are run on to platforms 17 ft. above the floor-level, and are either emptied into the coal-stores or run forward to the hydraulic tipping-cradles at the ends of the platforms nearest the retorts, and discharged into the main service-hoppers which supply the coal-breakers. The broken coal is elevated by gravity bucket conveyors to the high storage-hoppers placed at the end and centre of the retort-houses, from which the charging machines draw their supply when required, and deliver it into the retorts. There are 1440 horizontal retorts set in ovens of twelves, heated by fuel gas made in producers placed outside the retort-houses; this gas being conveyed to the retort-settings through steel mains lined with fire-bricks.

The coke, as it is drawn from the retorts, falls through openings in the retort-house floor into steel tipping-wagons beneath. These wagons, containing the hot coke, are drawn out by small locomotives; and the coke, after being quenched, is tipped into sunk hoppers, from which it is lifted and conveyed by gravity bucket conveyors to the screening machines, or deposited in stock-heaps below the coke gantries near to the low-level railway-sidings. The two three-lift holders are the largest in Scotland; the capacity of each being 8½ million c.ft. By means of steam turbo-boosters, gas can be sent to any of the other works through high-pressure mains.

An installation of water-gas plant to make 2½ million c.ft. per day is being erected.

WORKS IN GENERAL.

Hydraulic pressure of 500 lbs. per sq. in. is used at all the works for operating the Arrol-Foulis charging and drawing machines for the horizontal retorts, for opening and closing the vertical retorts, and for working the capstans and tippers for emptying the coal-wagons. Gas-engines are in use for driving the workshop machinery, for pumping water, for screening and conveying coke, and for elevating and conveying coal. Electricity is used for the coal breaking, elevating, and transporting plant at Dalmarnock, for the coke-transporting crane at Dawsholm, and for driving the benzol washers at Tradeston. Since the outbreak of war, plants for the recovery of benzol and toluol from the gas have been erected at Dawsholm, Provan, and Tradeston. In addition to a well-equipped laboratory, a coal-testing plant, with the necessary apparatus, capable of dealing with the hundredth-part of a ton, is installed at each of the gas-works.

STREET MAINS DEPARTMENT.

Of late the great demand for gas for industrial purposes has strained the resources of the department. The larger mains convey the gas at higher pressure to the various distributing stations, where the pressure is regulated to suit the districts supplied. The trunk mains are of large capacity to meet the demand, which varies during the different hours of the day; the largest mains being 48 in. diameter. Under the original and amending Gas Acts, the area now supplied with gas covers approximately 100 square miles.

WORKSHOPS AND FITTING DEPARTMENT.

In 1878 the premises in Walls Street were first opened. At this time stove-repairing was by no means heavy, only amounting to a few cookers per day; and this was done in the workshop. Soon it was found, owing to the advance in this branch of the industry, that still more room was required; and in 1904 a further extension was made at

Walls Street. The buildings at the Walls Street workshops are three storeys high in Walls Street and four storeys in Stirling Street, covering a ground area of 2477 sq. yards. They contain the fitting, the meter-repairing, meter-testing, stove and fire repairing, stove warehouse, and stores departments. During the year ending May, 1912, no less than 34,000 meters were repaired and overhauled in the department. The number of cooking appliances overhauled and repaired during the year ending May, 1912, was 15,800.

It was in the workshop at Virginia Street, a quarter-of-a-century ago, that the first range-fitting was experimented with and developed; the idea being that of the late Mr. Foulis. The intention was to economize space, especially in small kitchens. The range-fittings are similar to the crown plate of a cooker with ring and grill, and are placed on the top of the ordinary coal-range oven, which in turn is ventilated and fitted with gas, and so comprises a gas-cooker and kitchen coal-range combined; and either can be used independently. This successful gas cooking appliance evidently suited most Scottish kitchens. It leapt into favour, despite the annual hire of 6s., and gave a great fillip to gas cooking.

The following figures show the approximate number of cooking and heating appliances fixed, and the progress made:

	Cooking Appliances.		Heating Appliances.	
Year ending May 31.	Number in Use.	Number fixed during Year.	Number in Use (Hire).	Number fixed during Year.
1885	431	—	—	—
1890	6,615	6,184	—	—
1895	12,135	5,520	—	—
1900	17,722	5,587	—	—
1905	28,044	10,322	—	—
1909	58,928	30,884	—	—
1911	78,997	—	—	—
1912	100,693	21,696	—	—
1913	145,142	44,449	12,589	12,589
1514	172,152	27,010	26,587	14,198
1915*	197,656	25,504	45,680	18,893
1916*	214,596	16,940	46,612	932

* During these periods great difficulties were experienced in obtaining supplies from manufacturers, with the result that orders were stopped until further notice.

Show-Rooms.

The show-rooms situated in Sauchiehall Street are the outcome of the depôt opened in 1885 in George Street for the sale of gas-fires, &c.; and there are branch show-rooms at Govan, Partick, and Clydebank. The latest types of gas heating and cooking appliances are installed, as well as working exhibits of gas water-heating appliances, &c.

Gas-Furnace Demonstration Room.

When preparing premises at Milan Street, a portion was set aside for demonstrating the use of gas for industrial purposes. There are gas-furnaces for all classes of engineering work; and firms can bring their own material and carry out their tests, proving the efficiency of the furnaces for the work required. A duplex portable pyrometer set is installed, capable of recording temperatures from zero to 1400° C. A Féry instrument is used to record temperatures from 800° to 1700° C.

High-Pressure Lighting.

High-pressure lighting has been used in the city for some years. The gas is compressed at the Walls Street workshops. The development of this system has been restricted owing to war conditions.

Offices and Survey Department.

From the year 1870 until 1915 ordinary meter survey books were used for entering the records of the indices of consumers' meters; these records being transferred after each day's survey into ledgers, from which the account of each consumer was made out. In the latter year, however, a card system was introduced which superseded both the yearly survey books and yearly ledgers, and was applicable to the prepayment supply as well as the ordinary supply.

Since the introduction of the prepayment meter system, the registration of gas by these meters has risen from 114,500 to 1,530,007,000 c.ft. per annum.

The increasing number of meters dealt with by the survey department is as under:

Year.	Ordinary.	Prepayment.	Total.
1885	128,825	—	128,825
1890	134,215	—	134,215
1895	166,503	71	166,574
1901	206,236	328	206,564
1906	231,184	11,100	242,284
1910	223,889	49,957	273,846
1915	195,557	97,461	293,018
1918	191,677	103,073	294,750

The following table shows the development in gas manufacture from 1827 down to the end of the last financial year:

Gas Made in			
Year.	Cubic Feet.	Year.	Cubic Feet.
1827	79,235,000	1911	7,051,165,000
1837	162,606,000	1912	7,207,621,000
1847	391,353,000	1913	7,732,914,000
1860	769,241,000	1914	8,112,616,000
1870	1,295,863,000	1915	8,343,718,000
1880	1,859,582,000	1916	8,498,515,000
1890	3,059,277,000	1917	8,574,088,000
1900	5,969,111,000	1918	8,985,798,000
1910	6,977,904,000		

Staff.

The total staff in 1914 was 3137, and is still about this number, but includes a large proportion of women workers who have been brought into the department since the outbreak of war. The employees who have joined the forces now number 1100; and in recognition of their services to the country, allowances are paid by the department to their dependants.

Financial.

As a result of the sound financial policy of the Corporation, the capital value of the gas undertaking is:

Present book value of assets	£2,669,161 15 1
Liabilities	1,408,379 17 11
Surplus of assets over liabilities	1,260,781 17 2

The subjoined table shows the remarkable growth of the concern:

Year Ending	Gross Receipts.	Expenditure.
	£ s. d.	£ s. d.
May 31, 1870	235,701 6 4	173,955 10 6
,, 1880	341,274 13 1	227,079 11 2
,, 1890	417,589 0 5	317,825 17 8
,, 1900	770,002 16 10	646,281 3 10
,, 1910	879,434 2 0	664,439 3 2
,, 1918	1,621,779 16 0	1,522,544 5 4

A HALIFAX REPORT ON THE INSTITUTION MEETING.

A report on the special meeting in October of the Institution of Gas Engineers has been presented to the members of the Halifax Gas Committee by the Chairman (Mr. J. H. Waddington) and the Engineer and Manager (Mr. M'Lusky).

On the subject of the reconstruction of the National Gas Council, it is remarked that it has been recognized for some time that the industry should be represented by a permanent organization, composed largely of public representatives, directly responsible to the consumers. The need has been more plainly shown since the outbreak of war—particularly in regard to classification for the supply of essential materials. For war purposes, a National Gas Council was a necessity. It will be equally necessary to have a strong body in authority to deal with questions which will arise in connection with the re-adjustment of conditions of manufacture and supply after the war. Time and energy will be saved if the whole business of manufacture and supply of gas can be dealt with by a central organization of this character, which is in accord with the proposals of the Whitley Committee.

As to the work of the Gas Investigation Committee, the report says it became necessary, under war conditions, not only to obtain more gas from every ton of coal used, but to strip the gas produced of some of its principal constituents; the palpable result being gas of very low initial illuminating power, when used in open flat-flame burners, and a reduction of about 7 p.ct. in the total volume of heat available. It was observed, however, that, while the flame produced by the new gas was shorter than that of standard gas, the temperature of the flame was higher, and for many purposes superior to that obtainable from the quality of gas supplied before the war. Investigation showed that this higher flame temperature was due to the process by which the increased volume of gas was obtained; the best gas being produced by the steaming of a portion of the residual coke, either in the retorts or in a separate generator. Those who had vertical retorts adopted the former method; those who had not vertical retorts (including Halifax) adopted the latter course.

The reduction in the quantity of coal used in Halifax is shown below.

Year.	Coal Used.	Gas Made.	Yield of Gas per Ton of Coal Carbonized.
	Tons.	C.Ft.	C.Ft.
1913-14	73,542	893,563,000	12,150
1917-18	67,693	897,012,000	13,251

About twelve months ago a Committee were appointed to investigate the relative efficiencies of gases of various grades. This Committee, whose operations have been superintended by Lieutenant-Colonel Professor Smithells and Professor Cobb, of Leeds, have submitted an interim report, dealing with the grades of gas manufactured and supplied during the war, and the suitability of these gases for lighting, cooking, and heating. The conclusions arrived at by these eminent and independent investigators show that it is in the interest of consumers to be supplied with gas of about 450 B.Th.U., and that by producing gas of this standard by means of vertical retorts the yield of gas can be raised from the pre-war standard of 10,000 or 12,000 c.ft. to roundly 20,000 c.ft. per ton of coal carbonized, with an increase in the quantity and quality of the secondary products, and a reduction in the cost of production sufficient to enable the authorities to supply gas at a reduced price for all purposes.

The meeting was one of the largest and, probably, the most useful ever held in connection with the gas industry.

Power Gas Corporation.—The accounts show a profit for the year of £26,808, to which has to be added the balance brought forward from the previous year, less excess profits duty paid to Sept. 30, 1917, of £10,525, making together £37,423. Out of this the Directors have appropriated to the reserve fund the sum of £5350, and recommend the payment of a dividend at the rate of 6 p.ct. per annum less income-tax, absorbing £15,277, and that the balance of £16,796 be carried forward, out of which excess profits duty for the year will be met.

BURNLEY GAS-WORKS EXTENSIONS.

It was intimated by the Town Clerk, at the last meeting of the Burnley Corporation Gas Committee, that the Chairman (Alderman Emmott) and the Gas Engineer (Mr. J. P. Leather) had seen him with reference to proceeding, as early as possible, with the scheme for extending the works, and had informed him that, unless some further storage capacity were provided, they could not be responsible for satisfactorily supplying the town with gas during next winter.

The Town Clerk read a memorandum setting out the negotiations which had been arrived at in 1914 for the purchase by the Corporation of land at Old Hall Farm, Burnley, and also a conditional agreement for acquiring other land adjoining Old Hall Farm. He reported that the time for the publication of the necessary Parliamentary Notices to comply with the Standing Orders of Parliament for the next session had expired; but that he had been in communication with the Parliamentary Agents, and had ascertained that the Chairman of Committees had given an intimation that, having regard to the position created by the war and the signing of the armistice, he was prepared to accept late Bills for promotion in the next session. He further reported that the Local Government Board had intimated that they thought it possible to proceed by way of Provisional Order to be confirmed in the next session of Parliament; and it would be for the Council to determine whether they would proceed by Private Bill or by Provisional Order.

Instructions were given to the Town Clerk to report upon the respective advantages of the alternate methods of procedure.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Dec.* 9.

In the London tar products market, pitch still remains at not below 65s. net per ton f.o.b. producers' works. Shipments are being made steadily. Owing to the recent release of benzol for free sale, numerous inquiries are now being received for motor purposes; the price being 2s. 7d. net per gallon for re-sale in bulk at makers' works. The quantity purchased has to be endorsed on the buyer's petrol licence. Toluol is quoted at about 3s. 6d. net and naked *ex* works. All other products, including tar oils (which are still under control), remain unchanged.

The Government price for sulphate of ammonia is £16 5s. per ton December-February delivery, with a 10s. per ton reduction to approved agents and the usual adjustments on the 24½ p.ct. basis.

Tar Products in the Provinces.

Dec. 9.

The average values for gas-works products during the week were: Gas-works coal tar, 30s. 6d. to 35s. 6d. Pitch, East Coast, 44s. to 45s. per ton; West Coast—Manchester 35s. to 40s., Liverpool 35s. to 40s., Clyde 35s. to 40s. nominal. Benzol 90 p.ct., North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 7⅞d. to 8¼d. Solvent Naphtha, naked, North, 2s. 10d. to 2s. 11d. Heavy naphtha, North, 2s. 11d. to 3s. Creosote, in bulk, North, 4¼d. Heavy oils, in bulk, North, 5d. Carbolic acid, 60 p.ct. East and West Coasts, 3s. 6d. naked, nominal. Naphthalene, £25 to £30; salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per minimum 40 p.ct.; "B" quality, 1½d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

There is very little increase of business in tar products; all concerned still being inclined to await definite official action in connection with the release from control of several products. This official action can hardly be much longer delayed. Meantime, there is a slight improvement in the shipping position, particularly on the North-East-coast; and this has not been without effect upon pitch, which is still required in very large quantities. There is no change in London quotations; but in the Provinces prices are a shade harder. Fuel oils continue in urgent request, and tars are wanted at late rates. Naphtha and naphthalene prices have not changed, and in any event a downward course of quotations is not anticipated by those who are supposed to be authorities. Toluol is now being bought by dye industries; and it is expected that benzol, when released, will again come into private use as a motor spirit at a much higher price than that which the Government have been paying. Carbolic acid prices are fixed until the end of this year; and there is nothing at the moment to say about them. Cresylic acid meets a good demand at late rates, and other products are unchanged.

The range of quotations is as follows:

Benzol: 90% London, 1s. 0½d., North 10½d. to 11½d.; 50% North 1s. 4d. to 1s. 5d. naked per gallon.

Carbolic Acid: 60% East and West Coast 3s. per gallon; crystals 40% 1s. 8d. to 2s. per lb.

Crude Tar: London 39s. to 41s.; Midlands 33s. to 35s.; North 32s. to 34s. per ton *ex* works.

Pitch: London 65s. per ton f.o.b. works; East Coast, 38s. to 42s.; West Coast, 41s. 6d. to 43s. f.a.s.; Manchester, 41s. to 42s.; Clyde, 41s.; South Wales, 45s. to 46s. per ton.

Solvent Naphtha: London 3s. 9d. to 4s.; North and Midlands 3s. 3d. to 3s. 6d. per gallon.

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Crude Naphtha: Naked 30% 8½d. to 8¾d.; North 6¼d. to 6½d.
Heavy Naphtha: London 3s. to 3s. 6d.; Provincial 3s. 3d.
Naphthalene: Refined £28 per ton nominal; salts 80s., bags included.
Toluol: Naked, London 2s. 4d.; North 2s. 3d.
Creosote: Nominal, London 4¼d.; North 4d. to 4¼d. (Government price, 75s. per ton f.o.b.—equal to 4⅛d. per gallon); heavy oil, 4½d. per gallon in bulk.
Anthracene: "A" quality, 40-45%, 4½d. per unit; "B" quality, 1¼d. to 2½d.
Cresylic Acid: 95%, 3s. per gallon; 97-99%, 3s. 3d. to 3s. 6d. per gallon, casks included, *ex* works London and f.o.b. other ports.
Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Sulphate of Ammonia.

There is no change in conditions; but the position presents several points of interest at the moment. Prior to the armistice, it was, of course, known to the trade that the ambitious and comprehensive agricultural policy arranged by the Government would call for rather more sulphate of ammonia than was available. The cessation of the munitions demand, however, will probably mean that a fair amount of ammonium nitrate will be available for fertilizing purposes; for makers of this product have been informed that their interests will be safeguarded. Every effort will doubtless be made to satisfy as far as possible the demands of our Allies; but it does not appear that any considerable quantity will be available for some time to come, and Government control is hardly likely to be relaxed—in fact, it would not be surprising were such control to be continued for the five years covered by the Corn Production Act. Outside Allied requirements, it is a certainty that we shall be unable to immediately respond to the large demand which, in view of the high prices ruling, is very unfortunate from the trade point of view. Both home and foreign markets, however, are to be watched and indirectly developed by means of the trading company which the Sulphate of Ammonia Association propose to form—to be owned and controlled exclusively by manufacturers. Development work has already been undertaken in the home markets. With regard to foreign markets, united action on the part of manufacturers has often been advocated in these reports; and in connection with the proposed trading company, it would seem that the services should be secured of those well versed in the export trade—at any rate, until smoother working conditions have been achieved. As regards the competition which it was expected would be experienced from synthetic ammonia, it was stated by the Association recently that no results were likely on a commercial scale for some time to come. This does not, of course, agree with official announcements earlier in the year; and a statement is undoubtedly due as to interim progress. This should detail progress from inception, and also go fully into the matter of costs incurred in the preliminary stages, in order that those interested in nitrogenous manures may be guided as to how their interests are likely to be affected by any new methods of production.

The Bournemouth Gas-Works Extension Scheme.—The huge scheme of development at Poole by the Bournemouth Gas and Water Company (already briefly described in the "JOURNAL"), for which powers are proposed to be sought in Parliament, has not found favour with the local authority; and the Town Clerk has been instructed to take the necessary steps to oppose the Bill in Parliament. At the last meeting of the Council Mr. Cole expressed the hope that the Corporation would put up a big fight against the Company; otherwise he believed they would absolutely ruin the old borough.

Coal Difficulties at Pontefract.—At a meeting of the Pontefract Town Council, the Gas Manager (Mr. D. J. Branson) submitted a special report in reference to coal supplies. He said the shortage would probably be more serious than ever by the end of January; and there was already a great deficit in stocks at the works compared with a year ago. Unless the strictest economy were used, the town would soon be entirely without gas. The difficulty was increased by the inferior quality of the coal. They had to make more gas per ton out of much worse coal. It was decided that very little street lighting should be done in the town during the winter.

Fatality at the Bournemouth Gas-Works.—A case of asphyxia from poisonous gases last week occupied the attention of the Poole Borough Coronor and a Jury. The inquiry concerned the death of Lucy Stevens, aged 18 (a daughter of another of the Company's employees), who was working in the sulphate-house. A lad named Dyke, employed at the works, deposed that on returning from dinner, he heard an escape of steam, and found Stevens lying on her face unconscious, near a sulphate saturator. The whole of the plant had been stopped for cleaning down and was not restarted until the day of the accident. Replying to Mr. C. G. Travanion (on behalf of the Company), witness said he left an hour earlier than he should have done. It was his duty to help the girl if necessary. A forewoman named Ohren, in reply to questions by the Solicitor and Mr. F. J. Dunolly, of Southampton (H.M. Inspector of Factories), said that she saw the deceased talking to another girl on the benzol plant. As far as she was aware, there was no reason why deceased should have left the plant on which she was working; and witness considered the accident would not have happened if deceased had been there to put in a plug at the right time. Dr. Malcolm Lamb, who had made a post-mortem examination, said he came to the conclusion that death was due to asphyxia from poisonous gases—chiefly carbonic acid gas, "poisoning from which was almost as instantaneous as being shot." The Jury intimated that they agreed, for the purposes of a verdict, with the medical evidence as to the cause of death; but they were of opinion that the accident might have been avoided if closer supervision had been exercised. The Coroner mentioned that the Inspector informed him that he had had a consultation with the management of the Company; and the possibility of any such fatality occurrying again would, he believed, be reduced to a minimum. He (the Coroner) did not think there was any neglect anywhere.

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SHOWROOMS and BRANCHES: 25, PRINCES STREET, OXFORD CIRCUS, W. 1; 82, Gordon Street, GLASGOW; 18, Severn Street Deansgate, MANCHESTER; 97, Millfield, BELFAST; 333, Queen Street, MELBOURNE; and 12, Cunningham Lane, Pitt Street, SYDNEY, N.S.W.

Special Benzol Licences for Motor Vehicles.

The Board of Trade draw the attention of owners of motor vehicles to the fact that, owing to the cessation of hostilities, considerable quantities of benzol are now available for use as motor fuel; and the ordinary motor spirit licences can be used for the purchase of benzol as well as petrol. After Jan. 1, the Petrol Control Department will be prepared to issue special supplementary licences available for the purchase of benzol only. These special licences will authorize the purchase of a quantity of benzol exceeding by 50 p.ct. the quantity of petrol which would have been allocated on an ordinary motor spirit licence. In accordance with the announcement made by the Board on Nov. 15, licence-holders should apply for increased allotments of motor spirit after Jan. 1, and state whether they desire the supplementary allowance to be granted on an ordinary motor spirit licence, or on a special benzol licence. Licence-holders, to whom supplementary licences available for benzol only are issued, will be given the option of converting their original licences, wholly or in part, into licences available for benzol only. New applicants may apply for either an ordinary motor spirit licence or a special licence for the purchase of benzol only. Further information may be obtained from the Controller, Petrol Control Department, No. 19, Berkeley Street, London, W.1.

Purchase of the Elland Gas-Works to be Considered.—The Elland District Council have approved a recommendation of the General Purposes Committee that steps should be taken to consider the question of purchasing the Elland-cum-Greetland Gas Company's undertaking.

Haworth Gets Through the War Without Advancing Prices.—At the December meeting of the Haworth (Yorkshire) District Council, it was reported that at the previous meeting of the Gas Committee a motion that the price of gas should not be increased—it has not been advanced since the beginning of the war—was not carried; but an amendment that the price should be advanced from Dec. 31 by 3d. per 1000 c.ft., was met by a further amendment that there should be an increase of 2d. The second amendment was lost, as was a third amendment that the increase should be 1d. But the original motion was not put to the meeting. At the Council meeting, Mr. Ackroyd moved the 3d. advance, and quoted the various wartime rises of neighbouring undertakings; whereas the Haworth rate remained at 1s. 10d. Mr. Riley, showing that there had been no loss on the gas-works, moved an amendment that there should be no increase during the present financial year. The Chairman of the Committee said that particulars got out showed a difference of only £5 between the estimated income and expenditure, the latter being very generously estimated; and now that the war was over, they thought the high-water mark of working costs had been reached. The crux of the situation was in the reserve fund; and during the war they had added £1383 to this. The fund, he thought, was adequate to meet any demands which might arise. On a vote, the amendment that there should be no increase was carried by nine votes to six.

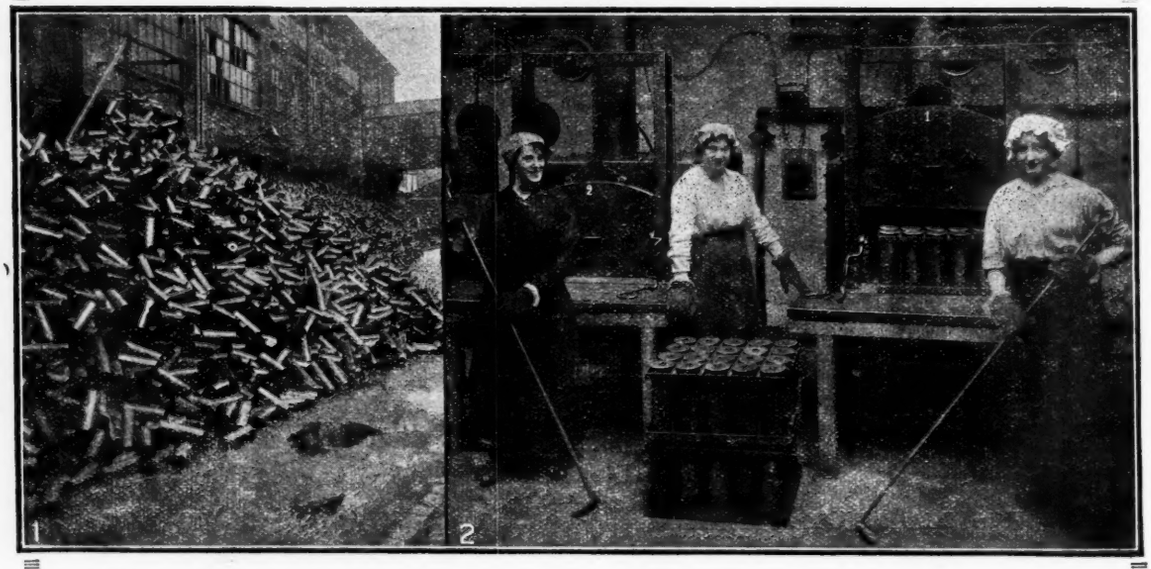
More Street Lighting for Leeds.—The Leeds Street Lighting Committee have decided to increase street lighting by using half the gas-lamps employed before the war. This means the lighting of about 8000 lamps. Up to the present, only 3100 have been in use. The Committee are seeking a supplementary grant from the Finance Committee for the purpose.

Gas Vehicles in Australia.—The Australian Gaslight Company, of Sydney, recently adopted coal gas for driving a motor-lorry. A 28 h.p. Milnes-Daimler lorry formerly running on petrol was equipped with an overhead container. The average consumption of gas works out at 34 miles per 1000 c.ft., costing, with gas at 4s. 1½d. per 1000 c.ft., 1½d. per mile. Working on petrol, the same vehicle consumed an average of a gallon per 7 miles, which, with petrol at 2s. 11d. per gallon, cost 5d. per mile. The distance travelled on one charge of gas is 8¾ miles. The cost of converting the lorry for use of gas was £35.

Gas-Works Damage to Sewage Farm Crops.—The Parliamentary Committee of the Stretford Urban District Council have received a letter from the Stretford Gas Company, enclosing cheque for £645 19s. 3d., in payment of an account rendered in respect of damage to crops at the sewage farm, and for clearing tarry sediment from the sewers, &c., up to July 31 last. The Company intimated that they had decided not to contest the claim; but in view of the fact that part of the account was based on estimate, they asked the Council to consider making a reduction from the amount claimed. The draft reply of the Clerk submitted was approved, stating that the value of the estimated damage to crops was based on a moderate computation of damage actually sustained; and the other items being for actual expenditure incurred, the Committee did not feel that any reasonable case was made out for a reduction.

Pensions Jeopardized by Strikes.—The Finance Committee of the Birmingham Corporation report that on several occasions they have received communications from the Gas Committee relative to strikes which have occurred at the gas-works; the men concerned absenting themselves from work without leave for several days at a time. The Superannuation Scheme, Part II., provides for the grant of pensions to officers and servants after a minimum of twenty years' "continuous service," which is defined as service without break or interruption, unless with the consent of the Corporation. On the facts placed before the Committee from time to time, it is clear that a breach of the provisions of the scheme with respect to "continuous service" has been occasioned by these strikes; but in each instance they have, at the request of the Gas Committee, exercised the option of the Corporation, and consented to the broken period of service being allowed to count for pension purposes—on the distinct understanding that such consents were not to be regarded as precedents. A further strike having recently occurred at the coal-test works, the Gas Committee have reported the facts to the Finance Committee, with a recommendation that the break of service on the part of the men who took part in the strike be ignored; and in this recommendation the Finance Committee concur.

Gas in War Time Industries



No. 16.—18-pdr. Cartridge Cases. Huge quantities of these Cartridge Cases have been regularly salved from the Western Front and rendered fit for use again by the aid of Gas. Illustrations show (1) Pile of Cases awaiting renovation and (2) "Richmond" Gas Furnaces in which the Annealing process is carried out.

THE RICHMOND GAS STOVE & METER CO., Ltd.,
WARRINGTON and LONDON.

Gateshead Town Council and Gas Quality.—It was reported by the Town Clerk, at a meeting of the Gateshead Town Council, that he had written to the Newcastle and Gateshead Gas Company pointing out that now hostilities had terminated, and the demand for benzol by the Government would cease, he trusted the quality of gas would be improved. He had received a communication from the Gas Company stating they were in communication with the Government, and hoped shortly to be in a position to improve the quality of the gas.

The Coal Difficulty at Hull.—The East Hull Gas Company, calling the attention of the Hull Corporation Gas Committee to the coal difficulty, suggested two alternatives—(1) to maintain the "standard" quality as far as it would go, with reduced pressure, or even the cutting off of the supply during certain hours of the day; (2) to maintain a full supply, with normal pressure, but of a reduced quality consistent with the coal supplies received. They urged that the latter suggestion would give the best results to the consumers, as, in their opinion, the present standard quality could be reduced without complaint. The Company stated that they had received an intimation from the colliery that, owing to the reduced output, deliveries would be reduced by one-third The Committee deputed the Chairman, Deputy-Chairman, and Engineer to consider the matter.

Negligence in Supplying "Tarvia."—Referring to the report in our Legal Intelligence last week of a case under this heading, Mr. W. J. A. Butterfield points out that in the evidence which he gave (under subpœna) the years were 1893 to 1896 [not 1906 as reported], and that he believed the South Metropolitan (though not the Commercial) Gas Company have produced a similar cyanogen liquor to that which he analyzed for Messrs. Bristowe.

Continental Union Gas Company, Ltd.—In their report for the twelve months ended June 30, which will be submitted to the shareholders at the meeting next Tuesday, the Directors state that war conditions again prevented the Company from receiving any revenue from their large Continental interests, and consequently the greater part of the capital remained unproductive during the year. The changes in the shipping situation which may be expected to follow a victorious peace must necessarily be gradual; and it is as yet too soon to forecast the measure of alleviation in freights to France and Italy, on which the return of the Company's prosperity will largely depend, or to say when it will be reflected in the accounts. After adding the interest and dividends received from the Company's minor investments, and deducting management and pensions charges and income-tax, the amount to be carried forward to next year is £5893—an increase of £3846.

STOCK MARKET REPORT.

THE Stock Exchange last week was not quite so bare of business as it was the week before; but even then it was upon a regrettably diminished scale. The cause of this state of things was still the same—the Election and the Christmas Holidays. Perhaps by the time these are over and done with we shall be able to get glimpses of what the New World that is to be created will be like, commercially speaking. But at present the watchword, in the Money Market as elsewhere, is "Wait and see."

The general tone, however, was not bad, especially in the leading markets. Home Government issues were in good case. War Loans and Consols were in steady request until on Friday the 5 p.ct. Loan touched 94⅝ and Consols 60¼. Indians were firm. Home Rails advanced on a statement that they were to be nationalized, and then receded in fear of an eight-hour day strike of employees throughout the country. Canadians and Argentines were not strong.

The Foreign Market was inactive and devoid of any engrossing feature. French started very well, then checked awhile, but recovered, and closed firm. Russians were dull, though advices from business centres were encouraging. In the Miscellaneous section, Explosives engaged most attention in view of combination prospects.

Business in the Gas Market was at about dead low water mark. Only eight undertakings came in for any transactions at all; and of these there were one or two that were just barely touched. Gas Light and Coke and Imperial Continental had most of the business. But the tone of the market did not suffer from the inanition. There were fourteen changes of quotation altogether, and all of them with only one exception were in the upward direction. These were three Gas Light and Coke issues, three Bournemouths, and two Brighton and Hove, with one deal each in Monte Video Oriental, Primitiva, South African, and South Metropolitan. The exception was Imperial Continental.

Bargains done for cash during the week were as follows: On Monday, Bombay 5⅛, European 13¼, Gas Light ordinary 71, 71⅜, 72, ditto maximum 55⅝, ditto preference 69, Imperial Continental 123, 124, 124⅛, 125, 125⅛, 126, Monte Video 8⅞, Primitiva 44s. 9d., South Metropolitan 74½, 76, Monte Video 5 p.ct. debenture 79. On Tuesday, Cape Town 3⅞, ditto preference 7⅜, Gas Light ordinary 72, 72¼, 72½, ditto debenture 56, Imperial Continental 123, Primitiva 43s. 9d., ditto preference 72s. 6d., 73s. 1½d., South Metropolitan 76. On Wednesday, European 13¼, 13½, Gas Light ordinary 71⅛, 71⅜, 72½, ditto maximum 55⅛, Imperial Continental 124, Monte Video 9¼, Primitiva preference 73s. 9d., South Metropolitan 75, 75⅛, 76, Cardiff 82, Maidstone 60, 60½. On Thursday, Gas Light ordinary 71⅜, 72⅜, 72½, 72⅝, ditto maximum 55⅝, 56, ditto preference 69½, ditto debenture 56¼, Imperial Continental 124, Primitiva 45s., ditto preference 73s. 9d., South Metropolitan 76, 77. On Friday, Gas Light ordinary 72, 72¼, 72⅜, 72⅛, Imperial Continental 122, 123½, 124¼, Monte Video 9¼, Primitiva 43s. 9d., ditto preference 72s. 6d.

In the Money Market, aided by the release of War Loan dividends, there was an abundant supply, and rates eased accordingly. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share.	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	55—60	..
1,551,868	,,	April 8	2½	4½%	Alliance & Dublin Ord.	59—64	51—56	..
274,000	,,	July 10	4	4%	Do. 4 p.c. Deb.	76—79	62—67	..
280,000	5	April 29	7½	8%	Bombay, Ltd.	5⅞—6⅜	5½—5¾	5⅝
50,000	10	Feb. 26	16	11%	Bournemouth Gas and Water { 10 p.c.	29—30	22—24	..
888,110	10	,,	7	7%	B 7 p.c.	15—15½	10½—11½	..
115,000	10	,,	6	6/-	Pref. 6 p.c.	13½—14	9½—10½	..
159,740	—	—	—	4%	4 p.c. Deb.	..	66—68	..
992,045	Stk.	Feb. 26	14	14%	Brentford A Consolid.	261—266	78—81	..
734,920	,,	,,	11	11%	Do. B New	204—209	70—73	..
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	77—82	..
221,400	,,	June 11	4	4%	Do. 4 p.c. Deb.	91—98	63—65	..
217,880	,,	Feb. 26	11	8¼%	Brighton & Hove Orig.	208—218	140—145	..
244,200	,,	,,	8	6¼%	Do. A Ord. Stk.	154—159	97—102	..
580,000	20	Mar. 26	12½	22/6	British	44—45	31½—32½	..
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	64—66	..
345,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	51—54	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½—2½	3⅜—4½	3⅜
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7½—8½	7½
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	79—81	..
1,518,280	,,	Feb. 12	5/9/4	36/-	Commercial 4 p.c. Stk.	106—108	62—67	..
550,000	,,	,,	5½	30/-	Do. 3½ p.c. do.	103—105	58—63	..
475,000	,,	June 11	8	8%	Do. 3 p.c. Deb. Stk.	69½—71½	52—54	..
800,000	,,	,,	4	—	Continental Union Ltd.	76—79	50—55	..
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	70—75	..
278,400	—	—	—	10½%	Croydon B and C 7 p.c.	..	135—140	..
—	—	—	—	10%	Do. E	..	..	..
492,270	Stk.	—	6	5½%	Derby Con. Stk.	128—135	95—100	..
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	80—83	..
1,002,180	10	July 29	10	5/0	European, Ltd.	17½—18	13—14	13½—13½
16,298,975	Stk.	Feb. 10	4/17/4	29/4	Gas Light and Coke { 4 p.c. Ord.	98—102	71—73	71—72½
2,600,000	,,	,,	3¼	3½%	3½ p.c. max.	76—79	55—57	55½—56
4,062,285	,,	,,	4	4%	4 p.c. Con. Pref.	96—99	68—70	69—69½
4,674,850	,,	June 11	8	8%	3 p.c. Con. Deb.	72½—74½	55—57	56—56½
180,000	,,	,,	10	10%	10 p.c. Bonds	..	..	..
258,740	,,	Mar. 12	5	22%	Hastings & St. L. 3½ p.c.	87—89	45—50	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½—16¾	7½—8½	..
86,600	—	—	—	9½%	Hornsey 7 p.c.	..	112—117	..
121,000	Stk.	Mar. 12	7½	6¼%	Ilford A and C.	151—154	92—97	..
65,780	,,	,,	6⅜	4⅜%	Do. B	115—118	70—75	..
65,500	,,	June 26	4	4%	Do. 4 p.c. Deb.	92—94	62—65	..
4,940,000	,,	May 14	9	4½%	Imperial Continental	150—160	121—126	122—126
1,235,000	,,	Feb. 12	8½	8½%	Do. 8½ p.c. Deb. Red.	84—86	71—73	..
235,242	,,	Mar. 12	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	93—98	..
2,498,905	,,	Feb. 26	10	5%	Liverpool 5 p.c. Ord. { A	211—213	83—84	..
						145—148		
306,088	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	71—73	..
75,000	5	June 11	6	8%	Malta & Mediterranean	4½—4⅝	3½—3¾*	..
250,000	100	April 1	4½	4½%	Met. of Melbourne { 4½ p.c. Deb.	99—101	87—98	..
541,920	20	May 26	4	6/-	Monte Video, Ltd.	11½—12	9—9½*	8⅞—9½
1,875,892	Stk.	July 29	4½	5½%	Newcastle&Gateh'd Con.	98½—99½	70—71	..
539,705	,,	June 26	8½	8½%	Do. 8½ p.c. Deb.	85—88	59—61	..
55,940	10	Feb. 26	7/14/0	7/0	North Middlesex 7 p.c.	14—15	9½—10½	..
800,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	102—105*	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7⅝	4—5	..
60,000	50	Feb. 26	13	9%	Portsea, Island B	128—131	73—83	..
100,000	50	,,	12	8%	Do. C	118—121	73—78	..
69,000	50	,,	10	6%	Do. D	..	..	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	2⅝—3⅜	43/9—45/-
499,960	5	June 26	5	2/6	Do. 5 p.c. Pref.	4¾—5	5⅝—6¼	72/6—73/9
521,800	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	74—76*	..
—	—	—	—	4%	Do. ,, ,, 1911	..	59—67	..
846,198	Stk.	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	55—60	..
150,000	10	May 14	6	6/	San Paulo { 6 p.c. Pref.	10¾—11	7½—8	..
125,000	50	July 1	5	5%	5 p.c. Deb.	47—49	40—42	..
135,000	Stk.	Mar. 12	10	10%	Sheffield A	232—234	170—173	..
209,984	,,	,,	10	10%	Do. B	222—224	170—173	..
538,500	,,	,,	10	10%	Do. C	220—222	168—172	..
90,000	10	May 28	9	6/-	South African	10½—11½	13—14	..
3,609,895	Stk.	Feb. 10	5/4/0	32/-	South Met. 4 p.c. Ord.	111—113	75—77	74½—77
250,000	,,	July 12	—	5%	Do. Pref.	..	91—96	..
1,895,445	,,	July 10	8	8%	Do. 3 p.c. Deb.	72½—74½	55—57	..
224,920	,,	Feb. 26	8½	6%	South Shields Con. Stk.	157—159	114—116	..
952,795	,,	,,	6	3¾%	S'th Suburb'n Ord. 5 p.c.	114—116	73—76	..
60,000	,,	,,	5	5%	Do. 5 p.c. Pref.	110—112	75—78	..
135,000	—	—	—	3½%	Do. West Kent	..	..	..
187,558	Stk.	June 26	6	5%	Do. 5 p.c. Deb. Stk.	116—118	85—87	..
647,740	,,	May 14	5	3%	Southampton Ord.	99—102	67—70	..
120,000	,,	Feb. 12	7½	5½%	Tottenham District { A 5 p.c.	135—138	92—97	..
782,275	,,	,,	6	4%	B 3½ p.c.	115—117	67—69	..
181,255	,,	June 26	4	4%	4 p.c. Deb.	87—89	62—64	..
183,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
236,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	103½—109½	87—88	..
					Wandsworth, Wimbledon, and Epsom—			
20,000	,,	Feb. 26	8⅝	68/9	Wandsworth A 5 p.c.	151—156	90—95	..
255,536	,,	,,	6⅛	48/9	Do. B 3½ p.c.	129—134	70—75	..
108,075	,,	,,	5/17/8	44/7½	Do. C 3½ p.c.	110—115	70—75	..
353,000	,,	,,	6⅛	48/6	Wimbledon 5 p.c.	117—122	70—75	..
98,000	,,	,,	6⅛	48/9	Epsom 5 p.c.	121—126	72—77	..
88,416	,,	June 26	3	3%	3 p.c. Deb. Stk.	66—69	49—52	..

* *Ex div.*

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

MANAGER (Coke Oven and Bye Products Works). No. 6530.
WORKING MANAGER. St Ives Gas-Works. Applications by Dec. 21.
INSPECTOR. No. 6541.
DRAUGHTSMAN. No. 6535.
JUNIOR TECHNICAL ASSISTANT. No. 6540.
CHIEF MECHANICAL FITTER. Lancashire Corporation.
CARBONIZING FOREMAN. Barnet Gas and Water Company.
FOREMEN. No. 6538.
FOREMAN. No. 6553.
FOREMAN (Maintenance of Offices). No. 6546.
SHIFT CARBONIZING FOREMAN. No. 6552.
WORKING FOREMAN. Stratford-on-Avon Gas-Works
MECHANIC (QUALIFIED). Warrington Gas-Works.
TAR-WORKS FOREMAN. No 6549.
TINMEN AND BRASS FINISHERS. No. 6551.
STOKER. No. 6547.

Appointments, &c., Wanted.

ENGINEER. No. 6542.
COKE OVEN AND BYE-PRODUCTS WORKS MANAGER. No. 6550.
DISTRICT INSPECTOR. No. 6548.
AGENCIES. C. R. Williams, Weston-super-Mare.
ENGINEER AND MANAGER. No. 6532.
RENTAL AND ESTIMATING WORK, &c. No. 6536.
DISTRICT INSPECTOR. No. 6543.

Plant, &c, Wanted.

STATION METER. Guernsey Gas Light Company.
STEAM HOIST. Leatherhead Gas-Works.

Plant, &c., for Sale.

COAL TRANSPORTERS. White Star Line, Liverpool.
COPPER COUNTING MACHINE. No. 6539.
GAS RADIATOR. Johns, City Road, E.C.
GASHOLDER, PURIFIERS, EXHAUSTER, &c. Leatherhead Gas-Works.
RETORT BENCH FITTINGS. Southampton Gas Company.

TENDERS FOR

Gasholder.

HINDLEY GAS DEPARTMENT. Tenders by Jan. 18.

Lighting Stores (Mantles, Burners, Lamps, Glassware, &c.).

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(See p. 592.)

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